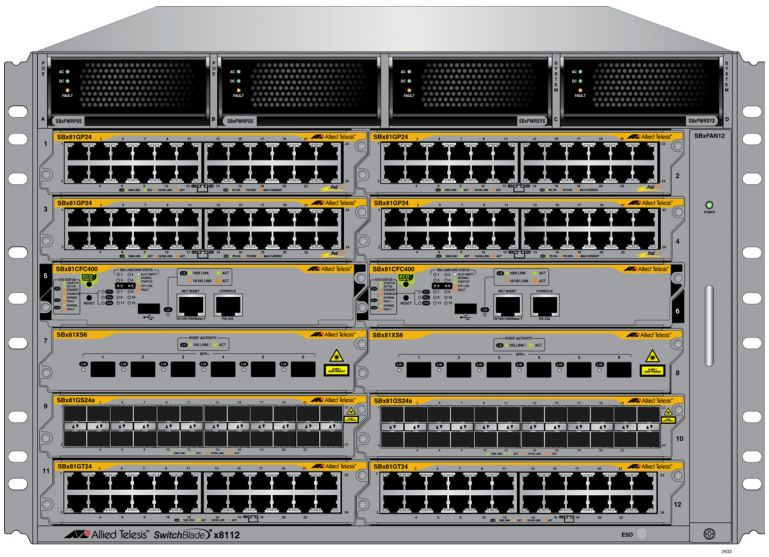
SwitchBlade x8112

Layer 3+ Chassis Switch

- AT-SBx8112 Chassis
- AT-SBx81GT24 Line Card
- AT-SBx81GP24 PoE Line Card
- AT-SBx81GS24a SFP Line Card
- AT-SBx81XS6 SFP+ Line Card
- AT-SBx81CFC400 Fabric Control Card
- AT-SBxPWRSYS1 System Power Supply
- AT-SBxPWRPOE1 PoE Power Supply
- AT-SBxFAN12 Module



Installation Guide

613-001716 Rev. A

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Electrical Safety and Emissions Standards

This product meets the following standards.

U.S. Federal Communications Commission
Radiated Energy Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Note: Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Industry Canada
This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment
This Allied Telesis RoHS-compliant product conforms to the European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment. Allied Telesis ensures RoHS conformance by requiring supplier Declarations of Conformity, monitoring incoming materials, and maintaining manufacturing process controls.

EMI/RFI Emissions	FCC Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, CISPR Class A, VCCI Class A, AS/NZS Class A

Warning: In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Immunity	EN55024
Electrical Safety	EN60950-1 (TUV), UL 60950-1 ($_{C}UL_{US}$), EN60825
Safety Agency Approvals	$_{C}UL_{US}$, TUV, C-TICK, CE
Laser Safety	EN60825

Translated Safety Statements

Important: The ☞ indicates that a translation of the safety statement is available in a PDF document titled “Translated Safety Statements” on our web site at **http://www.alliedtelesis.com/support**.

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Preface

This guide contains the hardware installation instructions for the Layer 3+ SwitchBlade x8112 Chassis Switch. The preface contains the following sections:

- “Safety Symbols Used in this Document” on page 14
- “Contacting Allied Telesis” on page 15

Note
This version of the installation guide applies to release 5.4.2 of the SwitchBlade x8112 Management Software.

Safety Symbols Used in this Document

This document uses the following conventions.

Note
Notes provide additional information.

Caution
Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.

Warning
Warnings inform you that performing or omitting a specific action may result in bodily injury.

Warning
Laser warnings inform you that an eye or skin hazard exists due to the presence of a Class 1 laser device.

Contacting Allied Telesis

If you need assistance with this product, you may contact Allied Telesis technical support by going to the Support & Services section of the Allied Telesis web site at **www.alliedtelesis.com/support**. You can find links for the following services on this page:

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Chapter 1
Overview

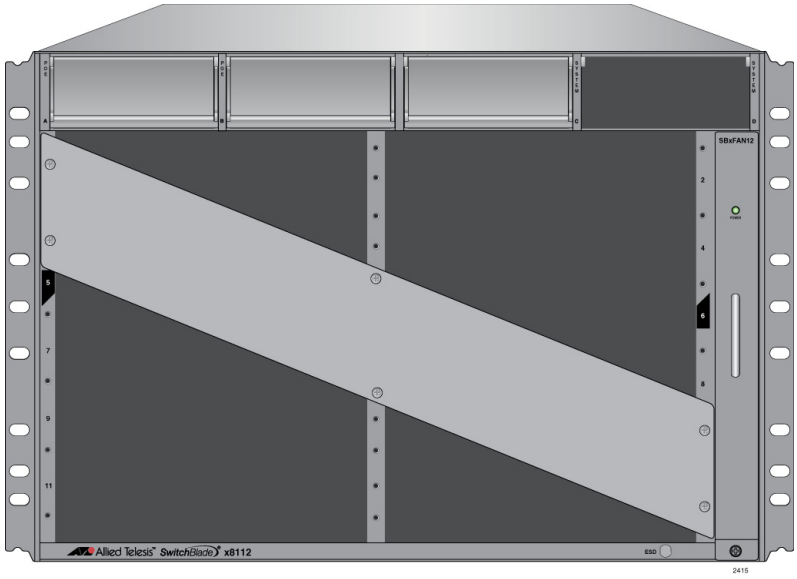
This chapter describes the Layer 3+ SwitchBlade x8112 Chassis Switch in the following sections:

- ❒ “Introduction” on page 18
- ❒ “AT-SBx8112 Chassis” on page 21
- ❒ “AT-SBx81GT24 Line Card” on page 25
- ❒ “AT-SBx81GP24 PoE Line Card” on page 26
- ❒ “AT-SBx81GS24a SFP Line Card” on page 27
- ❒ “AT-SBx81XS6 SFP+ Line Card” on page 28
- ❒ “10/100/1000Base-T Twisted Pair Ports” on page 29
- ❒ “Power over Ethernet on the AT-SBx81GP24 Line Card” on page 32
- ❒ “Port LEDs on the Ethernet Line Cards” on page 35
- ❒ “AT-SBx81CFC400 Controller Fabric Card” on page 40
- ❒ “AT-SBxPWRSYS1 Power Supply” on page 49
- ❒ “AT-SBxPWRPOE1 Power Supply” on page 51
- ❒ “AT-SBxFAN12 Module” on page 53
- ❒ “Power Supply Interfaces (Opto-couplers)” on page 54
- ❒ “Management Software Releases for the Hardware Components” on page 55

Note
This version of the installation guide applies to release 5.4.2 of the SwitchBlade x8112 Management Software.

Introduction

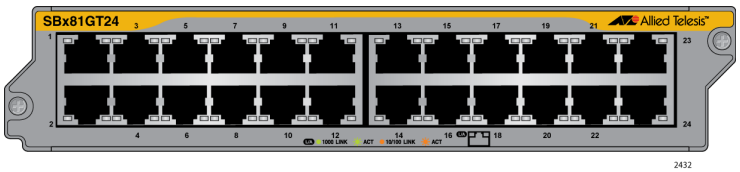
The SwitchBlade x8112 product is a modular Layer 3+ Ethernet switch. The main components are the AT-SBx8112 Chassis, four Ethernet line cards, a controller card. system power supply, Power over Ethernet Plus (PoE+) power supply, and fan module. The AT-SBx8112 Chassis is shown in Figure 1.



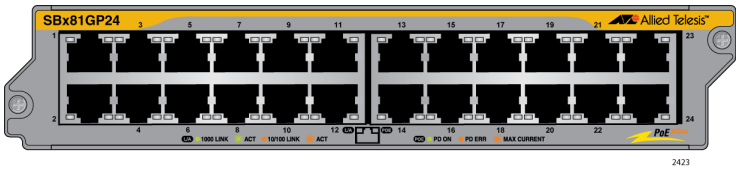
Slots for ten Ethernet line cards, two controller cards, two system power supplies, and two PoE+ power supplies.

Figure 1. AT-SBx8112 Chassis

The Ethernet line cards and controller card are shown in Figure 2 here and Figure 3 on page 19.

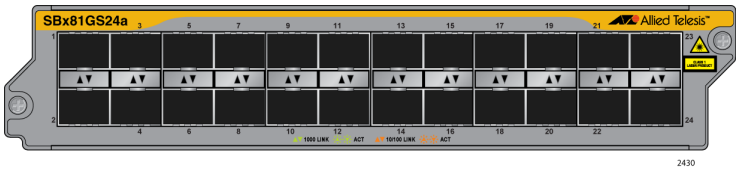


AT-SBx81GT24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports.

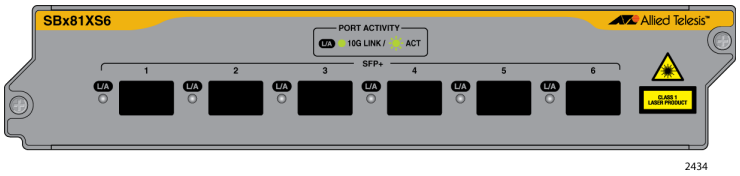


AT-SBx81GP24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports, with PoE+.

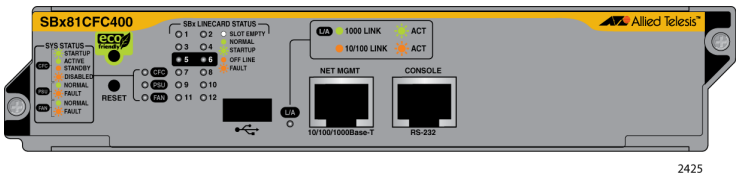
Figure 2. Ethernet Line Cards and Controller Card



AT-SBx81GS24a SFP Ethernet Card with 24 slots for 100 or 1000Mbps, fiber optic or twisted pair SFP transceivers.



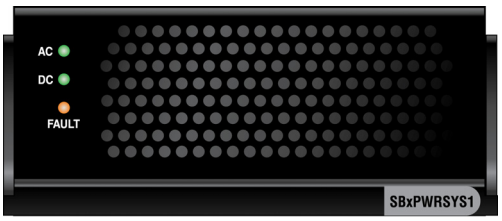
AT-SBx81XS6 SFP+ Ethernet Card with six slots for 10Gbps, fiber optic SFP+ transceivers, or Twinax direct connect cables.



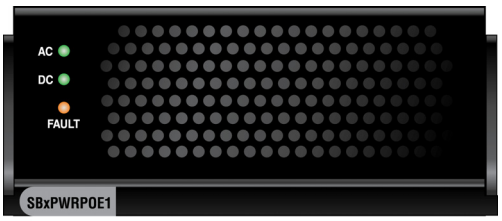
AT-SBx81CFC400 Controller Fabric Card.

Figure 3. Ethernet Line Cards and Controller Card (Continued)

Figure 4 illustrates the power supply modules.



AT-SBxPWRSYS1 (AC) Power Supply for the Ethernet line cards, controller card, and fan module.



AT-SBxPWRPOE1 (AC) Power Supply with 1200 W PoE budget for the ports on the AT-SBx81GP24 PoE Ethernet Line Card.

Figure 4. Power Supply Units

Figure 5 illustrates the fan module.

AT-SBxFAN12 Module Cooling module for the chassis.

Figure 5. Fan Module

AT-SBx8112 Chassis

The AT-SBx8112 Chassis is a 7RU unit. It has slots for ten Ethernet line cards, two controller cards, two system power supply modules, and two PoE power supply modules. The chassis components are identified in Figure 6 here and Figure 7 on page 22.

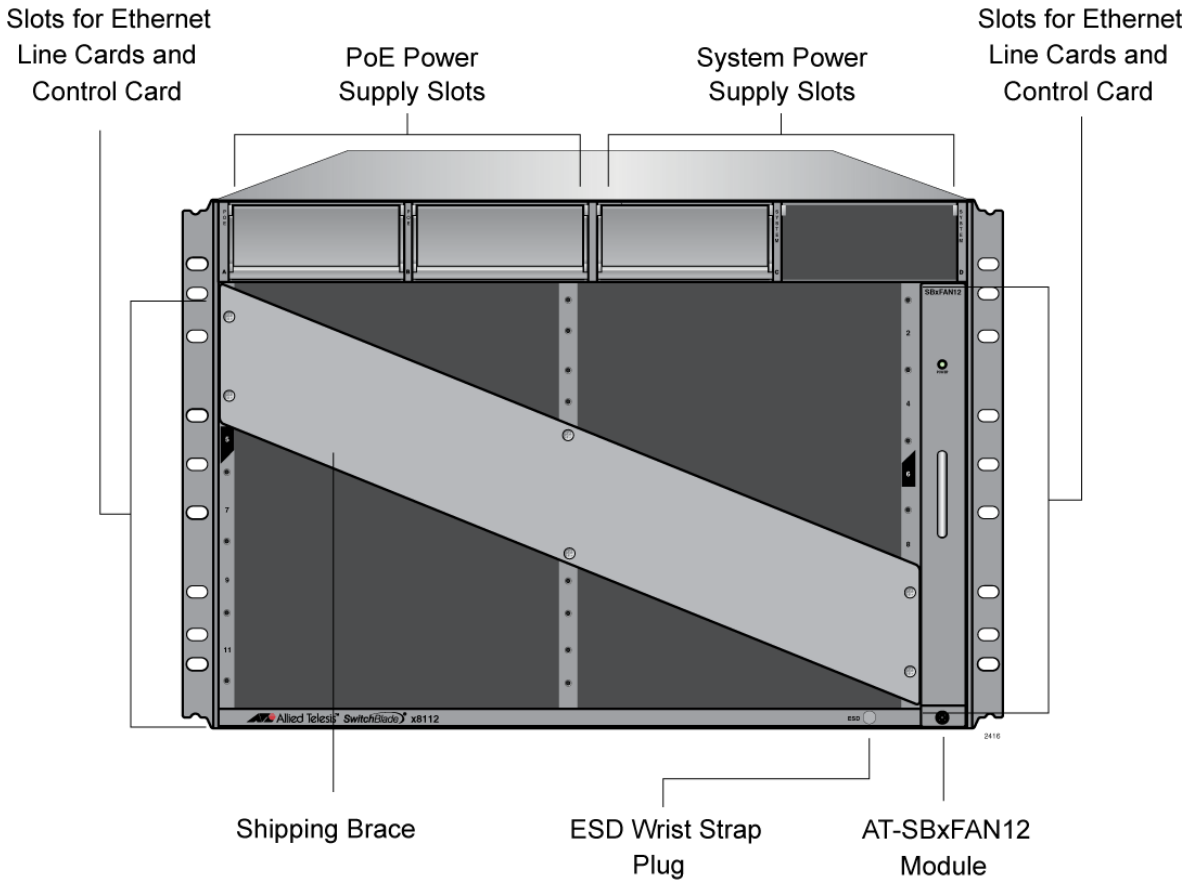

Slots for Ethernet Line Cards and Control Card
PoE Power Supply Slots
System Power Supply Slots
Slots for Ethernet Line Cards and Control Card
Shipping Brace
ESD Wrist Strap Plug
AT-SBxFAN12 Module

Figure 6. Front View of the AT-SBx8112 Chassis

Note
Do not remove the shipping brace from the front of the chassis until after the unit is installed in the equipment rack. You might bend the chassis and cause misalignment of the slots and card guides if you lift the chassis into the equipment rack without the shipping brace.

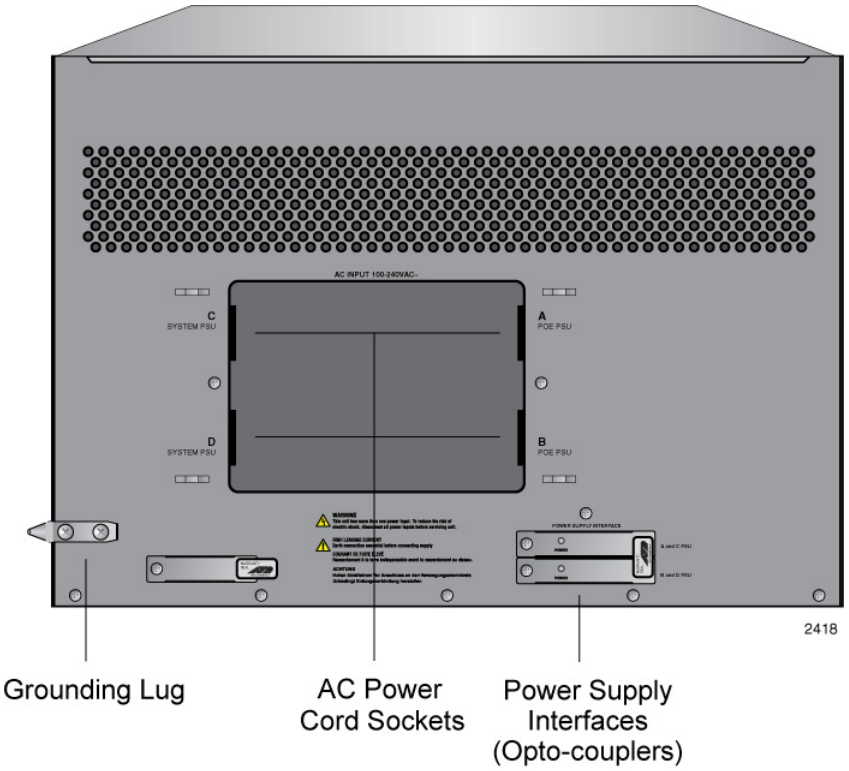


Figure 7. Rear View of the AT-SBx8112 Chassis

Figure 8 is an example of a fully populated chassis.

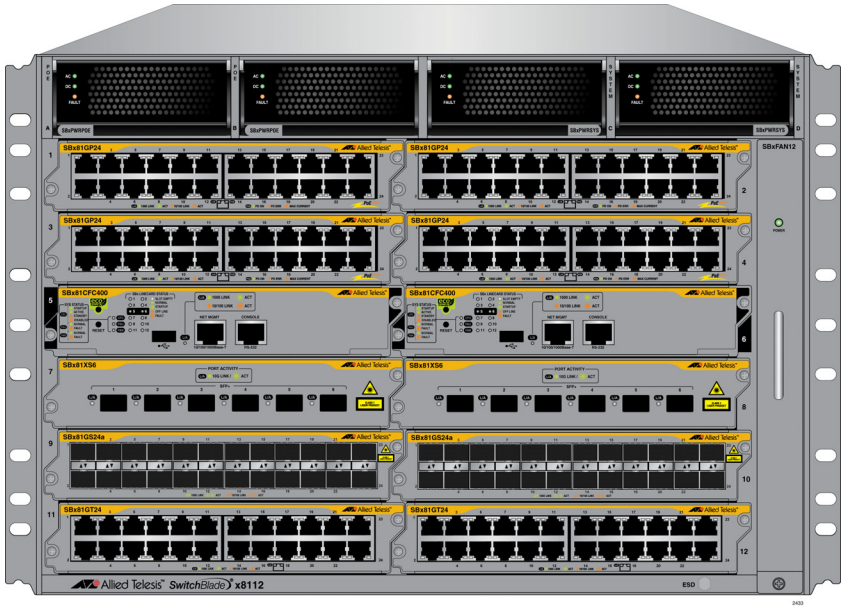


Figure 8. AT-SBx8112 Chassis with Line Cards, Controller Cards, and Power Supplies

Ethernet Line and Controller Cards Slots

The chassis has slots for ten Ethernet line cards and two AT-SBx81CFC400 Controller Cards. The slot definitions are predefined and may not be changed. Figure 9 identifies the slots.

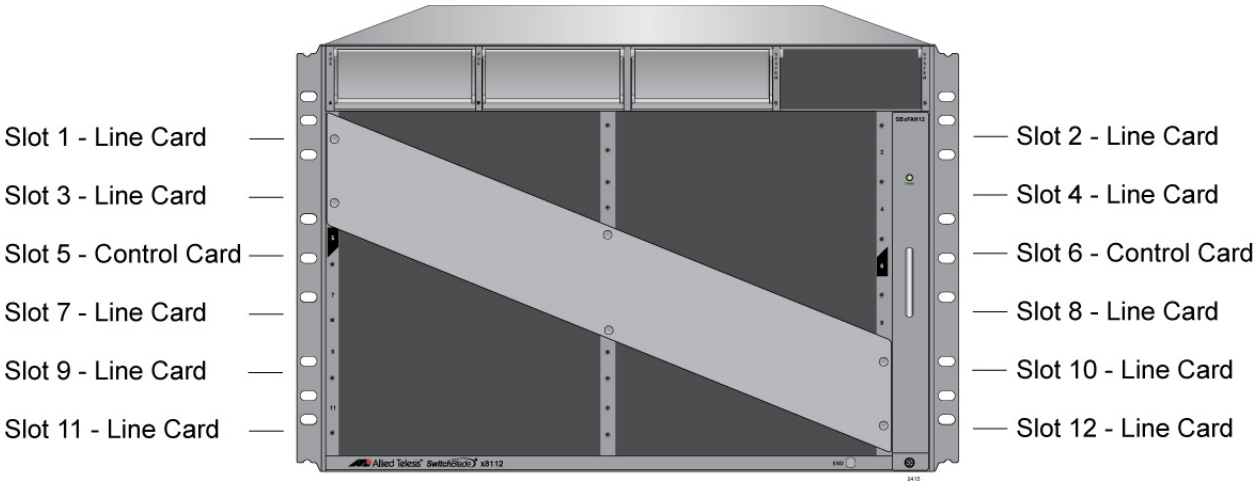

Slot 1 - Line Card
Slot 3 - Line Card
Slot 5 - Control Card
Slot 7 - Line Card
Slot 9 - Line Card
Slot 11 - Line Card
Slot 2 - Line Card
Slot 4 - Line Card
Slot 6 - Control Card
Slot 8 - Line Card
Slot 10 - Line Card
Slot 12 - Line Card

Figure 9. Ethernet Line and Controller Cards Slots

Slots 1 to 4 and 7 to 12 are for the Ethernet line cards. The cards may be installed in any order or variety in the slots.

Slots 5 and 6 are for the AT-SBx81CFC400 Controller Fabric Card, of which there must be at least one in the chassis. You may add a second controller to add redundancy or to increase the available traffic bandwidth of the chassis.

Power Supply Slots

The chassis has four power supply slots, labelled A to D, across the top of the front of the chassis, as shown in Figure 10.

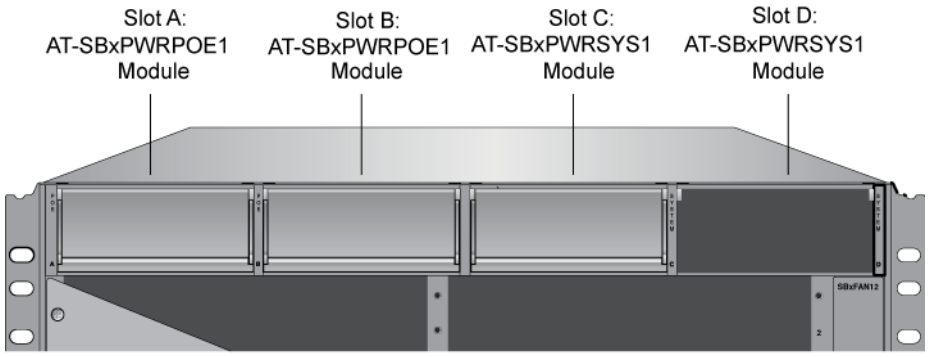


Figure 10. Power Supply Slots

The two right hand slots are for the AT-SBxPWRSYS1 Power Supply. The module supplies power to all the Ethernet line cards, control modules, and fan module. The only chassis component that is not powered by the module is the PoE feature on the twisted pair ports of the AT-SBx81GP24 PoE Line Card.

The chassis must have at least one AT-SBxPWRSYS1 Power Supply. A single AT-SBxPWRSYS1 Power Supply can power a fully populated chassis, but there are two slots so that you may install two power supplies to add power redundancy to the chassis.

The two left hand slots are for the AT-SBxPWRPOE1 Power Supply, which provides PoE for the ports on the AT-SBx81GP24 Line Card. (It should be noted that the line card also needs the AT-SBxPWRSYS1 Power Supply to operate its switching functions.) You may install two AT-SBxPWRPOE1 Power Supplies in the chassis to add PoE redundancy or to increase the amount of available PoE power.

AT-SBx81GT24 Line Card

The AT-SBx81GT24 Line Card, shown in Figure 11, is a Gigabit Ethernet switch.

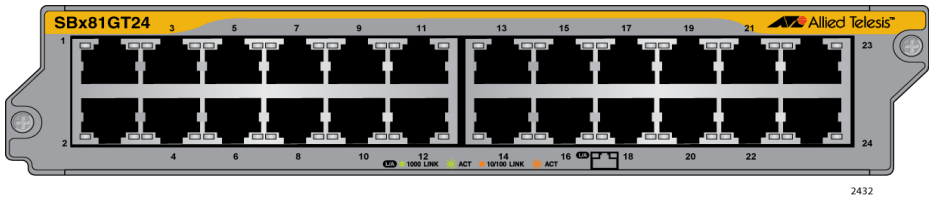


Figure 11. AT-SBx81GT24 Line Card

Here are the main features of the line card:

- 24 10/100/1000Base-T ports
- RJ-45 connectors
- 100 meters (328 feet) maximum operating distance per port
- Auto-Negotiation for speed and duplex mode
- Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- Port Link/Activity (L/A) LEDs
- 16K entry MAC address table
- 12 Mb buffer memory
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Non-blocking full-wire speed switching on all packet sizes, with two AT-SBx81CFC400 Controller Fabric Cards
- Hot swappable

The cable requirements for the ports on the AT-SBx81GT24 Line Card are listed in Table 1 on page 30.

AT-SBx81GP24 PoE Line Card

The AT-SBx81GP24 PoE Line Card, shown in Figure 12, is a Gigabit Ethernet switch with Power over Ethernet Plus (PoE+) on all the ports.

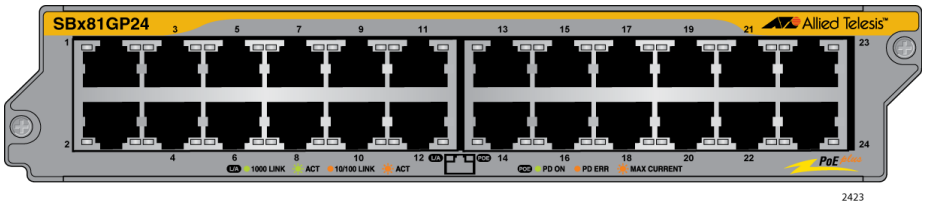


Figure 12. AT-SBx81GP24 PoE Line Card

Here are the main features of the line card:

- 24 10/100/1000Base-T ports
- RJ-45 connectors
- 100 meters (328 feet) maximum operating distance per port
- Auto-Negotiation for speed and duplex mode
- Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- Port Link/Activity (L/A) and PoE+ LEDs
- 16K entry MAC address table
- 12 Mb buffer memory
- PoE+ on all the ports
- Up to 30W per port for PoE+
- PoE device classes 0 to 4
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Non-blocking full-wire speed switching on all packet sizes, with two AT-SBx81CFC400 Controller Fabric Cards
- Hot swappable

The cable requirements of the PoE ports on the AT-SBx81GP24 Ethernet Line Card are listed in Table 2 on page 30.

AT-SBx81GS24a SFP Line Card

The AT-SBx81GS24a SFP Line Card, shown in Figure 13, is a Gigabit Ethernet switch.

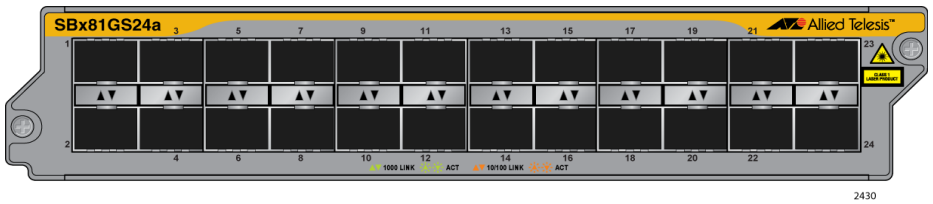


Figure 13. AT-SBx81GS24a SFP Line Card

Here are the main features of the line card:

- 24 slots for small form-factor pluggable (SFP) transceivers
- Supports 100Base-FX and 1000Base-SX/LX fiber optic transceivers
- Supports 100Base-BX and 1000Base-LX bidirectional (BiDi) fiber optic transceivers
- Supports 10/100/1000Base-T and 1000Base-T twisted pair transceivers
- Port Link/Activity (L/A) LEDs
- 32K entry MAC address table
- 16 Mb buffer memory
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Non-blocking full-wire speed switching on all packet sizes, with two AT-SBx81CFC400 Controller Fabric Cards.
- Hot swappable

Contact your Allied Telesis sales representative for a list of supported transceivers.

AT-SBx81XS6 SFP+ Line Card

The AT-SBx81XS6 Line Card, shown in Figure 14, is a 10 Gigabit Ethernet switch.

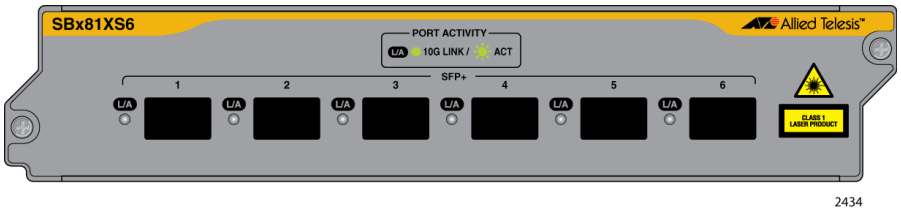


Figure 14. AT-SBx81XS6 Line Card

Here are the main features of the line card:

- Six slots for 10Gbps SFP+ transceivers
- Supports 10GBase-SR/LR fiber optic transceivers
- Supports AT-SP10TW direct connect twisted pair cables with SFP+ transceiver-style connectors
- Port Link/Activity (L/A) LEDs
- 32K entry MAC address table
- 16 Mb buffer memory
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Hot swappable

Contact your Allied Telesis sales representative for a list of supported transceivers.

10/100/1000Base-T Twisted Pair Ports

This section applies to the 10/100/1000Base-T ports on the AT-SBx81GT24 and AT-SBx81GP24 PoE Ethernet Line Cards.

Connector Type

The ports have 8-pin RJ-45 connectors. The ports use four pins at 10 or 100 Mbps and all eight pins at 1000 Mbps. The pin assignments are listed in “Connectors and Port Pinouts” on page 167.

Speed

The ports can operate at 10, 100, or 1000 Mbps. The speeds can be set automatically through Auto-Negotiation, the default setting, or manually with the SwitchBlade x8112 Management Software.

Note
Twisted-pair ports have to be set to Auto-Negotiation to operate at 1000 Mbps. You cannot manually set twisted-pair ports to 1000 Mbps.

Duplex Mode

The twisted-pair ports can operate in either half- or full-duplex mode at 10 or 100 Mbps. Ports operating at 1000 Mbps can only operate in full-duplex mode. The twisted-pair ports are IEEE 802.3u-compliant and Auto-Negotiate the duplex mode setting.

You can disable Auto-Negotiation on the ports and set the duplex mode manually.

Note
Switch ports that are connected to 10 or 100 Mbps end nodes that are not using Auto-Negotiation should not use Auto-Negotiation to set their speed and duplex mode settings, because duplex mode mismatches might occur. You should disable Auto-Negotiation and set the speed and duplex mode settings manually with the SwitchBlade x8112 Management Software.

Maximum Distance

The ports have a maximum operating distance of 100 meters (328 feet).

Cable Requirements

The cable requirements for the ports on the AT-SBx81GT24 Line Card are listed in Table 1.

Table 1. Twisted Pair Cable for the AT-SBx81GT24 Line Card

Cable Type	10Mbps	100Mbps	1000Mbps
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.	Yes	Yes	No
Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes

The cable requirements for the PoE ports on the AT-SBx81GP24 Ethernet Line Card are given in Table 2.

Table 2. Twisted Pair Cable for the AT-SBx81GP24 Line Card

Cable Type	10Mbps			100Mbps			1000Mbps		
	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.	Yes	No	No	Yes	No	No	No	No	No
Standard TIA/EIA 568-A-compliant Category 5 shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	No	Yes	Yes	No	Yes	No	No

Table 2. Twisted Pair Cable for the AT-SBx81GP24 Line Card (Continued)

Cable Type	10Mbps			100Mbps			1000Mbps		
	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+
Standard TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Automatic MDIX Detection

The 10/100/1000 Mbps twisted-pair ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards are IEEE 802.3ab compliant and feature automatic MDIX detection when operating at 10 or 100 Mbps. (Automatic MDIX detection does not apply to 1000 Mbps.) This feature automatically configures the ports to MDI or MDI-X depending on the wiring configurations of the end nodes.

Ports connected to network devices that do not support automatic MDIX detection default to MDIX.

You may disable automatic MDIX detection on the individual ports and configure the MDI/MDI-X settings manually with the POLARITY command.

Port Pinouts

Refer to Table 34 on page 167 for the port pinouts of the twisted-pair ports when they operate at 10 or 100 Mbps in the MDI configuration and Table 35 on page 167 for the MDI-X configuration. For port pinouts when the twisted-pair ports operate at 1000 Mbps, refer to Table 36 on page 168.

Power over Ethernet on the AT-SBx81GP24 Line Card

This section applies to the AT-SBx81GP24 PoE Line Card. The twisted-pair ports on the line card support Power over Ethernet (PoE). PoE is a mechanism by which the ports supply power to network devices over the twisted pair cables that carry the network traffic. This feature can simplify network installation and maintenance because it allows you to use the switch as a central power source for other network devices.

Devices that receive their power over Ethernet cables are called powered devices (PD), examples of which include wireless access points, IP telephones, web cams, and even other Ethernet switches. A PD connected to a port on the switch receives both network traffic and power over the same twisted-pair cable.

The AT-SBx81GP24 Line Card automatically determines whether a device connected to a port is a PD. A PD has a signature resistor or signature capacitor that the line card can detect over the Ethernet cabling. If the resistor or capacitor is present, the switch assumes that the device is a PD.

A port connected to a network node that is not a PD (that is, a device that receives its power from another power source) functions as a regular Ethernet port, without PoE. The PoE feature remains enabled on the port but no power is delivered to the device.

Powered Device Classes

The IEEE 802.3af and 802.3at standards define five powered device classes. The classes are defined by the power requirements of the powered devices. The classes are shown in Table 3. The AT-SBx81GP24 Line Card supports all five classes.

Table 3. IEEE802.3af and IEEE802.3at Powered Device Classes

Class	Usage	Maximum Power Output on the PoE Port	PD Power Range
0	Default	15.4W	.044W to 12.95W
1	Optional	4.0W	0.44W to 3.84W
2	Optional	7.0W	3.84W to 6.49W
3	Optional	15.4W	6.49W to 12.95W
4	Optional	30.0W	12.95W to 25.9W

Power Budgeting

The power for PoE on the ports on the AT-SBx81GP24 Line Card is provided by the AT-SBxPWRPOE1 Power Supply. It can provide up to 1200 watts of power for powered devices. You may install up to two power supplies in the chassis for a total of 2400 watts for the powered devices.

The number of powered devices the chassis can support at one time depends on the number of AT-SBxPWRPOE1 Power Supplies in the chassis and the power requirements of the powered devices in your network. Table 4 lists the maximum number of powered devices by class, for one or two power supplies. The numbers assume that the powered devices require the maximum amount of power for their classes.

Note
The maximum number of PoE ports in the SwitchBlade x8112 Switch is 240 ports.

Table 4. Maximum Number of Powered Devices

Class	Maximum Number of Ports with One PoE PSU (1200 W)	Maximum Number of Ports with Two PoE PSU's (2400 W)
0	77	155
1	240	240
2	171	240
3	77	155
4	40	80

PoE Wiring

The IEEE 802.3af and 802.3at standards define two methods for delivering power to powered devices over the four pairs of strands that comprise a standard Ethernet twisted-pair cable. The methods are called Alternatives A and B. In Alternative A, power is supplied to powered devices on strands 1, 2, 3, and 6, which are the same strands that carry the 10/100Base-TX network traffic. In Alternative B, power is delivered on strands 4, 5, 7, and 8. These are the unused strands.

Note
1000BASE-T cables carry the network traffic on all eight strands of the Ethernet cable.

The PoE implementation on the AT-SBx81GP24 Line Card is Alternative A. Power is transmitted on strands 1, 2, 3, and 6.

PDs that comply with the IEEE 802.3af and 802.3at standards typically support both power delivery methods. However, some legacy PDs support only one power delivery method. Legacy devices that only support Alternative B will not work with the AT-SBx81GP24 PoE Line Card. Legacy devices are nodes manufactured before the IEEE 802.3af and 802.3at standards were completed and, consequently, may not adhere to the standards.

Port LEDs on the Ethernet Line Cards

The following sections define the port LEDs on the Ethernet line cards.

AT-SBx81GT24 Line Card

Each port on the AT-SBx81GT24 Line Card has two LEDs. The LEDs are shown in Figure 15 and described in Table 5.

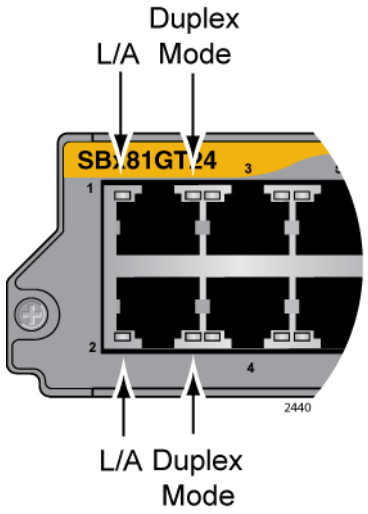


Figure 15. Port LEDs on the AT-SBx81GT24 Line Card

Table 5. Port LEDs on the AT-SBx81GT24 Line Card

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100.
	Off	The port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

Table 5. Port LEDs on the AT-SBx81GT24 Line Card

LED	State	Description
Duplex Mode	Solid Green	The port is operating in full duplex mode.
	Solid Amber	The port is operating in half duplex mode.
	Flashing amber	The port is operating in half duplex mode, with collisions.
	Off	The port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

AT-SBx81GP24 Line Card

Each port on the AT-SBx81GP24 PoE Line Card has two LEDs. The LEDs are shown in Figure 16 and described in Table 6 on page 37.

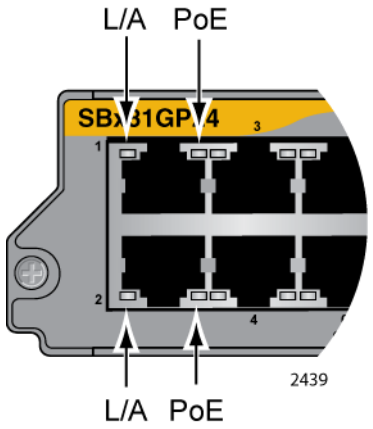


Figure 16. Port LEDs on the AT-SBx81GP24 PoE Line Card

Table 6. Port LEDs on the AT-SBx81GP24 PoE Line Card

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100 Mbps.
	Off	The port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
PoE	Green	The switch is detecting a powered device (PD) on the port and is delivering power to it.
	Solid Amber	The switch has shutdown PoE+ on the port because of a fault condition.
	Flashing Amber	The switch is detecting a PD on the port but is not delivering power to it because the maximum power budget has been reached.
PoE	Off	This LED state can result from the following conditions: ❒ The port is not connected to a PD. ❒ The PD is powered off. ❒ The port is disabled in the management software. ❒ PoE is disabled on the port. ❒ The LEDs on the Ethernet line cards are turned off. To turn on the LEDs, use the eco-friendly button.

AT-SBx81GS24a Line Card

The SFP slots on the AT-SBx81GS24a SFP Line Card have one LED each, as shown in Figure 17 and described in Table 7.

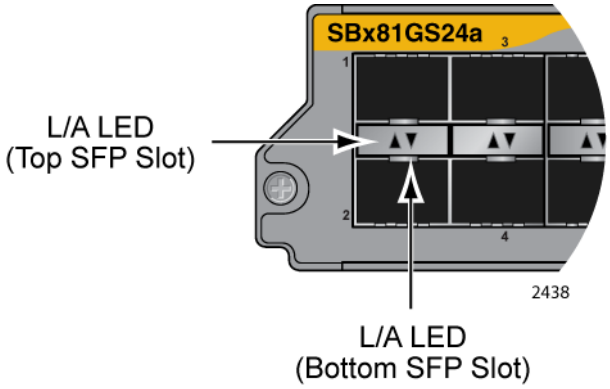


Figure 17. Port LEDs on the AT-SBx81GS24a SFP Line Card

Table 7. Port LEDs on the AT-SBx81GS24a SFP Line Card

LED State	Description
Solid Amber	The SFP transceiver in the slot has established a 10 or 100 Mbps link to a network device.
Blinking Amber	The SFP transceiver is transmitting and/or receiving data at 10 or 100 Mbps.
Solid Green	The SFP transceiver in the slot has established an 1000 Mbps link to a network device.
Blinking Green	The SFP transceiver is transmitting and/or receiving data at 1000 Mbps.
Off	The slot is empty or the SFP transceiver has not established a link to a network device.

AT-SBx81XS6 Line Card

The AT-SBx81XS6 Line Card has one LED for each SFP+ slot. The LED is shown in Figure 18 and described in Table 8 on page 39.

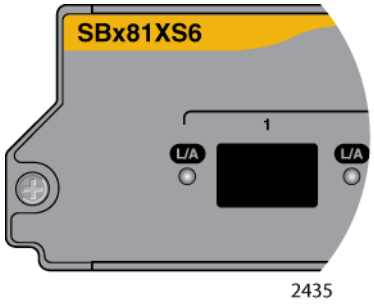


Figure 18. SFP+ Slot LEDs on the AT-SBx81XS6 Line Card

Table 8. SFP+ Slot LEDs on the AT-SBx81XS6 Line Card

LED	State	Description
L/A	Solid Green	The transceiver has established a link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10 Gbps.
	Off	This LED state can result from the following conditions: ❒ The transceiver slot is empty. ❒ The transceiver has not established a link with a network device. ❒ The LEDs on the Ethernet line cards are turned off. To turn on the LEDs, use the eco-friendly button.

AT-SBx81CFC400 Controller Fabric Card

The AT-SBx81CFC400 Controller Fabric Card has three primary functions:

- Chassis Management — You may use the controller card to monitor and configure the Ethernet line cards in the chassis. You may manage the chassis locally through the Console RS-232 port on the controller card or remotely using Telnet, Secure Shell (SSH), and SNMP clients from workstations on your network.
- Management Software and Configuration Settings — The controller card stores the management software and configuration settings for the Ethernet line cards in the chassis and downloads the files to the cards when the chassis is powered on or new line cards are installed. The settings are stored in a database file in nonvolatile memory so that they are retained even when the chassis is reset or powered off.
- Backplane Controller — The controller card manages the backplane of the chassis, which the line cards use to forward traffic to each other.

  A single controller card provides 400 Gbps of backplane bandwidth. You may install a second controller card for a total of 800 Gbps of backplane bandwidth.

Here are the guidelines to the controller card:

- The chassis must have at least one controller card. The line cards do not forward traffic if the chassis does not have a controller card.
- The chassis may have either one or two controller cards.
- Two controller cards are recommended for redundancy and to increase the backplane bandwidth from 400 to 800 Gbps.
- The controller cards must be installed in slots 5 and 6 in the chassis.

Here are other features of the AT-SBx81CFC400 Controller Fabric Card:

- LEDs for monitoring the status of the Ethernet line cards.
- Power-saving eco-friendly button for turning the port and status LEDs on or off on the line cards and controller cards.
- Reset switch for resetting the chassis.
- USB port for data storage and retrieval.
- Console RS-232 for local management.
- NET MGMT port for remote Telnet, SSH, and SNMP management.
- Hot swappable.

The components on the card are identified in Figure 19.

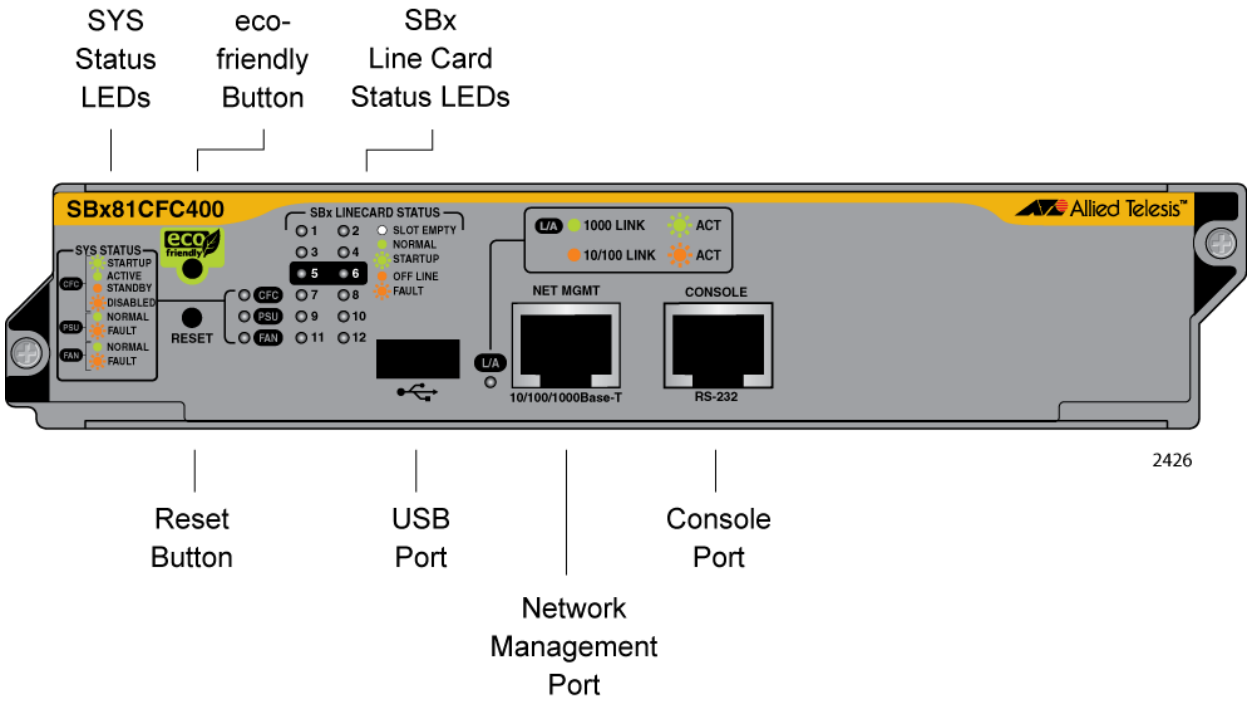


Figure 19. AT-SBx81CFC400 Controller Fabric Card

Where two controller cards are installed in the chassis, they provide an active/active architecture. The packet processors on both controller cards are fully utilized to double the available backplane bandwidth from 400 to 800 Gbps for the entire chassis, or 40 to 80 Gbps per line card.

One of the controller cards becomes the active master. In normal operations, this is the controller card in slot 5. The active master manages the system and processes CPU bound network traffic. The standby master runs all network protocol modules and is kept in sync with the active master card, so as to be available in hot-standby for near instantaneous fail over, if required.

If the active master card is hot-swapped out, the standby master becomes the active master. It takes over all control functions almost instantaneously. Testing has shown no noticeable disruption to streaming video.

You can determine the state of the controller card by viewing the CFC LED on the card. The controller card is the active master when the LED is solid green and the standby master when the LED is solid amber.

SYS Status LEDs

The SYS (System) Status LEDs on the controller fabric card display general status information about the controller card, power supplies, and fan module. The LEDs are defined in Table 9 on page 42.

Table 9. SYS (System) Status LEDs

LED	State	Description
CFC	Solid Green	Indicates that the AT-SBx81CFC400 Controller Fabric Card is operating normally as the active master controller card.
	Flashing Green	Indicates that the controller card is initializing its management software or synchronizing its database with the active master controller card.
	Solid Amber	Indicates that the controller card is operating normally as the standby master controller card.
	Flashing Amber	Indicates that the controller card is disabled. Possible causes are: ❒ The standby master controller card was disabled by the active master controller card because the two cards have incompatible versions of the management software and were unable to resolve the problem, possibly because of insufficient free flash memory.
PSU	Solid Green	Indicates that the power supplies are operating properly.
	Flashing Amber	Indicates that a power supply is experiencing a problem. Possible causes are: ❒ The input AC voltage from a power source is not within the normal operating range of a power supply module. ❒ The output DC voltage from a power supply module to the line cards is not within the normal operating range. ❒ A power supply is experiencing high temperature. ❒ A power supply has failed. Check the status LEDs on the individual power supply modules to determine which module has a fault condition.
FAN	Solid Green	Indicates that the fan module is operating properly.
	Flashing Amber	Indicates that the fan module has a problem. The fans are operating below the normal operating range or have stopped.

SBx STATUS LEDs

The SBx LINECARD STATUS LEDs display general status information about the Ethernet line cards and controller cards. There is one LED for each slot. If the chassis has two controller cards, the SBx Status LEDs on both cards are active. The LEDs are defined in Table 10 on page 43.

Table 10. SBx LINECARD STATUS LEDs

LEDs	State	Description
1 to 12	Off	Indicates that the slot is empty.
	Solid Green	Indicates that the Ethernet line or controller card is operating normally.
	Flashing Green	Indicates that the card is booting up, running in test mode, or loading its configuration settings.
	Solid Amber	Indicates that the card is in an off-line state. Possible causes are: ❒ An Ethernet line card that displays this LED state may have encountered a problem initializing the management software. ❒ An Ethernet line card that displays this LED state might not be able to boot up because the controller card does not have the appropriate load file and needs to be updated to the most recent release of the management software. ❒ A standby master controller card that displays this LED state may have been disabled by the active master controller card because the cards have incompatible versions of the management software and were unable to resolve the problem, possibly because of insufficient free flash memory. You may remove a line or controller card from the chassis when it is in this state.
	Flashing Amber	Indicates that the card is reporting a fault condition. Use the management commands to determine the specific problem.

eco-friendly Button

You may use the eco-friendly button on the controller card to turn the LEDs on or off. You may turn off the LEDs when you are not using them to monitor the control and Ethernet line cards, to conserve electricity. When the LEDs are off, the overall power consumption of the chassis is slightly reduced, approximately 3 watts in a system with 240 active copper ports.

The button controls all of the port LEDs on the Ethernet line cards and controller card, except for the CFC LED, which is always on, and the L/A LED for the NET MGMT port. The button does not control the LEDs on the fan module and power supply systems.

Reset Button

You may use the Reset button to reset either the controller card or all of the cards in the chassis. The action depends on the number of AT-SBx81CFC400 Controller Cards in the chassis and, if the chassis has two controller cards, whether you reset the active or standby master controller card.

The possible actions are described here:

- If the chassis has only one controller card, pressing the Reset button resets the controller card and all of the Ethernet line cards in the chassis. You may perform this function if the chassis and line cards are experiencing a problem.

Caution
The control and Ethernet line cards do not forward network traffic for a minimum of two minutes while they initialize their management software and configure their parameter settings. Some network traffic may be lost.

- If the chassis has two controller cards, pressing the Reset button on the active master controller card resets the controller card, but not the Ethernet line cards. The standby master controller card immediately becomes the new active master card and the Ethernet line cards continue to forward traffic. The reset controller card is unavailable for about two minutes while it initializes its management software, after which it becomes the standby master controller card in the chassis.

Note
The available bandwidth across the backplane of the chassis is reduced from 800 to 400 Gbps for about one minute while the reset controller card initializes its management software. This may reduce network performance.

- If the chassis has two controller cards, pressing the Reset button on the standby master controller card resets that card, but not the active master controller card or the Ethernet line cards.

Note
The available bandwidth across the backplane of the chassis is reduced from 800 to 400 Gbps for about one minute while the standby master controller card initializes its management software and synchronizes its database with the active master controller card. This may reduce network performance.

Note
To reset individual line cards in the chassis, use the REBOOT or RELOAD command in the management software.

NET MGMT Port

The NET MGMT port is a standard 10/100/1000Base-T Ethernet port. You may use it as an alternative to the ports on the Ethernet line cards for support of the features in Table 11. You may connect the port to a router, switch, media converter, workstation, server, or other network device.

The controller card uses the port as a standard network link for data reception and transmission. It is used only by the controller card and cannot be accessed from the line cards in the unit.

When the controller card performs a feature in Table 11, it establishes a data link with the corresponding network device using either the NET MGMT port or a port on an Ethernet line card. For example, when you manage the switch remotely using its Telnet server, the data link between the Telnet client on your workstation and the server on the controller card is established either on the NET MGMT port or a port on an Ethernet line card, wherever the Telnet client is located.

You are not required to use the NET MGMT to use the features in Table 11. The controller card can communicate with network devices, such as Telnet clients, FTP server, and SNTP server, over the ports on the Ethernet line cards.

For instructions on how to configure the NET MGMT port, refer to the *Software Reference for SwitchBlade x8100 Series Switches*.

Table 11. Features that Use the NET MGMT Port

Feature	Description
Ping	Used to test the NET MGMT port for network connectivity.
FTP client	Used with an FTP server on your network to download files to or upload files from the controller card.

Table 11. Features that Use the NET MGMT Port (Continued)

Feature	Description
RADIUS client	Used for remote management authentication and 802.1x port-based network access control.
RMON with SNMP	Used with the RMON portion of the MIB tree on an SNMP workstation to remotely monitor the switch.
Secure Shell server	Used to remotely manage the chassis with a Secure Shell client.
SNMPv1 and v2c	Used to remotely manage the chassis with SNMP.
SNTP client	Used to set the date and time on the controller card, from an NTP or SNTP server on your network or the Internet.
Syslog client	Used to send the event messages from the controller card to syslog servers on the network.
TACACS+ client	Used with a TACACS+ server on your network for remote management authentication.
Telnet server	Used to remotely manage the chassis with a Telnet client.
TFTP client	Used to download files to or upload files from the controller card with TFTP.
TRACEROUTE	Used to determine the intermediate nodes (or hops) of network paths.

The NET MGMT port has a standard RJ-45 8-pin connector and operates at 10, 100, or 1000 Mbps in either half- or full-duplex mode. The cable requirements for this port are the same as the ports on the AT-SBx81GT24 Line Card, given in Table 1 on page 30. For the port pinouts, refer to “Connectors and Port Pinouts” on page 167.

The default setting for the port is Auto-Negotiation, which sets the speed and duplex mode automatically. You may disable Auto-Negotiation and configure the port manually. The port is referred to as ETH0 in the management software.

The wiring configuration of the NET MGMT port is set automatically with automatic MDIX detection. You may disable automatic MDIX detection and set the wiring configuration manually.

NET MGMT LED

The Network Management (NET MGMT) port on the AT-SBx81CFC400 Controller Fabric Card has one Status LED, described in Table 12.

Table 12. NET MGMT Port LED

LED	State	Description
L/A	Solid Green	The port has a valid 1000 Mbps link.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has a valid 10 or 100 Mbps link.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100 Mbps.
	Off	The port has not established a link to a network device.

Console (RS-232) Port

The Console Port is used to conduct local management sessions with the switch. Local management sessions are established with a terminal or PC with a terminal emulation program, and the management cable that comes with the card.

Local management is referred to as out-of-band management because it is not conducted over a network. Consequently, the AT-SBx81CFC400 Controller Fabric Card does not need an Internet Protocol (IP) address for this type of management.

Your initial management session with the switch must be a local management session. For instructions on how to start a local management session, refer to “Using Local Management to Verify the Chassis” on page 142 or the Software Reference for SwitchBlade x8100 Series Switches.

USB Port

The USB port supports a flash drive. You may use a flash drive to perform the following management functions:

- Store backup copies of the master configuration and database files on the AT-SBx81CFC400 Controller Fabric Card.
- Transfer master configuration files between controller cards in different chassis that are to have similar configurations.
- Transfer application load files between controller cards.
- Store streaming log files.

- Boot the management software release and master configuration file from flash drive.

The port is compatible with USB v1.0 and v2.0 flash drives. Operating the controller card with a flash drive is optional.

AT-SBxPWRSYS1 Power Supply

The AT-SBxPWRSYS1 Power Supply, shown in Figure 20, is the power supply unit for the chassis. The unit supplies power to all of the hardware components in the chassis, except for the PoE feature on the ports on the AT-SBx81GP24 Line Cards. The PoE feature is powered by the AT-SBxPWRPOE1 Power Supply.

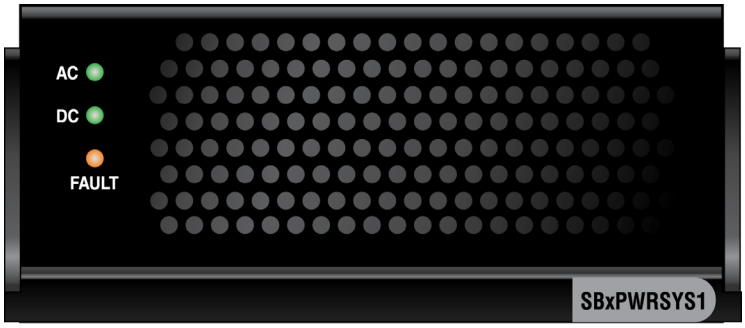


Figure 20. AT-SBxPWRSYS1 Power Supply

A single AT-SBxPWRSYS1 Power Supply can support a fully populated chassis, with any combination of Ethernet line cards. The chassis can have two AT-SBxPWRSYS1 Power Supplies for power redundancy.

Power supply modules are not included with the chassis and must be purchased separately.

The AT-SBxPWRSYS1 Power Supplies are installed in the two right hand slots, labeled C and D, at the top of the front of the chassis. If you are installing just one power supply, you may install it in either slot. The locations of the slots are shown in Figure 8, “AT-SBx8112 Chassis with Line Cards, Controller Cards, and Power Supplies” on page 22.

The AT-SBxPWRSYS1 Power Supply is hot swappable. If a chassis has two power supplies and one of them fails, you may replace the failed unit without having to power off the chassis.

LEDs

The LEDs on the AT-SBxPWRSYS1 are described in Table 13 on page 50.

Table 13. AT-SBxPWRSYS1 Power Supply LEDs

LED	State	Description
AC	Solid Green	The power supply is receiving AC power that is within the normal operating range.
	Off	The power supply is not receiving power from the AC power source.
DC	Solid Green	The power supply is providing DC power that is within the normal operating range.
	Off	The power supply is not generating DC power or the power is outside the normal operating range.
Fault	Solid Amber	A power supply has detected a fault condition, such as an under-voltage, or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

AT-SBxPWRPOE1 Power Supply

The AT-SBxPWRPOE1 Power Supply, shown in Figure 21, provides the PoE power for the ports on the AT-SBx81GP24 PoE Line Cards. You may install either one or two PoE power supplies in the chassis.

The AT-SBxPWRPOE1 Power Supply provides 1200 watts of power for PoE. You may install two power supplies in the chassis for a total of 2,400 watts of power.

The total number of powered devices the chassis can support depends on the number of AT-SBxPWRPOE1 Power Supplies in the chassis and the power requirements of the devices. For instance, a chassis can support 40 ports of Class 4, PoE+ (IEEE 802.3at) powered devices with one power supply or 80 ports with two power supplies. For further information, refer to Table 4 on page 33.

Figure 21. AT-SBxPWRPOE1 Power Supply

Power supply modules are not included with the chassis and must be purchased separately.

The AT-SBxPWRPOE1 Power Supplies are installed in the two left hand slots, labeled A and B, at the top of the front of the chassis. If you are installing only one power supply, you may install it in either slot. The locations of the slots are shown in Figure 8, “AT-SBx8112 Chassis with Line Cards, Controller Cards, and Power Supplies” on page 22.

The AT-SBxPWRPOE1 Power Supply is hot swappable. You do not have to power off the chassis to install or remove the power supply.

LEDs

The LEDs on the AT-SBxPWRPOE1 Power Supply are described in Table 14 on page 52.

Table 14. AT-SBxPWRPOE1 Power Supply LEDs

LED	State	Description
AC	Solid Green	The power supply is receiving AC power that is within the normal operating range.
	Off	The power supply is not receiving power from the AC power source.
DC	Solid Green	The DC power provided by the power supply to the line cards over the backplane is within the normal operating range.
	Off	The power supply is not providing any DC power or the power is not within the normal operating range.
Fault	Solid Amber	The power supply has detected a fault condition, such as an under-voltage or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

AT-SBxFAN12 Module

The AT-SBxFAN12 Module is the cooling unit for the chassis. It is a field-replaceable assembly that is factory installed and shipped with the AT-SBx8112 Chassis.

The module is controlled by the AT-SBx81CFC400 Controller Fabric Card. The fan speeds are automatically adjusted according to the internal operating temperature of the switch. The fans are at their lowest speed when the ambient temperature coming into the fan is approximately 20° C. The fan speeds increase to provide additional cooling as the ambient temperature rises.

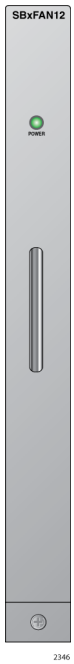


Figure 22. AT-SBxFAN12 Module

LED

The POWER LED on the AT-SBxFAN12 Module is described in Table 15.

Table 15. AT-SBxFAN12 Module LED

LED	State	Description
Power	Solid Green	The AT-SBxFAN12 Module is receiving power.
	OFF	The AT-SBxFAN12 Module is not receiving power or has failed.

Power Supply Interfaces (Opto-couplers)

The chassis has two power supply interfaces, also referred to as opto-couplers, in the lower right corner on the rear panel. The interfaces, labeled Power Supply Interface, are used by the active master controller card to obtain status information from the power supplies. The interfaces are shown in Figure 23.

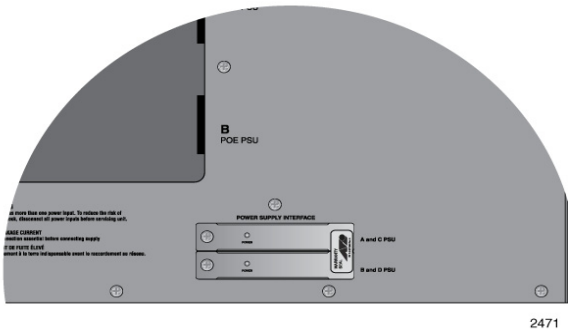


Figure 23. Power Supply Interfaces (Opto-couplers)

The controller card uses the top interface to communicate with the power supplies in slots A and C, and the bottom interface to communicate with the power supplies in slots B and D.

The power supply interfaces are not hot swappable and should only be serviced by an authorized service technician.

LED

Each interface has one LED, labeled Power. The LED is described in Table 16.

Table 16. Power Supply Interface LED

LED	State	Description
Power	Solid Green	The interface is operating normally.
	Off	Here are the possible conditions for this LED state: ❒ The corresponding power supply slots of the interface are empty. ❒ The power supplies in the power supply slots are powered off or have failed. ❒ The power supplies in the power supply slots are powered on and functioning normally, but the power supply interface has failed.

Management Software Releases for the Hardware Components

Table 17 lists the management software releases for the hardware components of the SwitchBlade x8112 product.

Table 17. Management Software Releases for the Hardware Components

Model Number	Initial Release
AT-SBx8112 Chassis	5.4.2
AT-SBx81GT24 Line Card	5.4.2
AT-SBx81GP24 Line Card	5.4.2
AT-SBx81GS24a Line Card	5.4.2
AT-SBx81XS6 Line Card	5.4.2
AT-SBx81CFC400 Controller Card	5.4.2
AT-SBxPWRSYS1 System Power Supply	5.4.2
AT-SBxPWRPOE1 PoE Power Supply	5.4.2
AT-SBxFAN12 Fan Module	5.4.2

Chapter 2

Safety Precautions and Site Requirements

This chapter contains the safety precautions and guidelines for selecting a site for the chassis. The chapter contains the following sections:

- “Reviewing Safety Precautions” on page 58
- “Selecting a Site for the SwitchBlade x8112” on page 62

Reviewing Safety Precautions

Please review the following safety precautions before you begin to install the switch.

Note
The ✍ indicates that a translation of the safety statement is available for viewing in portable document format (PDF) titled **Translated Safety Statements** from our web site at **www.alliedtelesis.com/support**.

Warning
Class 1 Laser product. ✍ L1

Warning
Do not stare into the laser beam. ✍ L2

Warning
To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables. ✍ E1

Warning
Do not work on equipment or cables during periods of lightning activity. ✍ E2

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. ✍ E3

Warning
Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts. ✍ E4

Note
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. E5

Caution
Air vents must not be blocked and must have free access to the room ambient air for cooling. E6

Warning
Operating Temperature. This product is designed for a maximum ambient temperature of 40° degrees C. E7

Note
All Countries: Install product in accordance with local and National Electrical Codes. E8

Warning
When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last. E11

Caution
Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on over current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. E21

Caution
Risk of explosion if battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Attention: Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d'explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur. E22

Warning
Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading. E25

Warning
Remove all metal jewelry, such as rings and watches, before installing or removing a line card from a powered-on chassis. E26

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. E28

Warning
This unit might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing the unit. E30

Note
If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra). E35

Caution
Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. E36

Warning
Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuits (e.g., use of power strips). E37

Warning
To reduce the risk of electric shock, the PoE ports on this product must not connect to cabling that is routed outside the building where this device is located. E40

Warning
This product may have multiple AC power cords installed. To de-energize this equipment, disconnect all power cords from the device. E43

Caution
An Energy Hazard exists inside this equipment. Do not insert hands or tools into open chassis slots or sockets. E44

Warning
This equipment shall be installed in a Restricted Access location. E45

Warning
High Leakage Current exists in this chassis. Connect external ground wire before connecting AC power supply(s). E46

Selecting a Site for the SwitchBlade x8112

Please observe the following site requirements for the switch:

- The equipment rack must be safely secured so that it will not tip over. Devices in a rack should be installed starting at the bottom, with the heavier devices near the bottom of the rack.
- The power outlet for the switch should be located near the unit and should be easily accessible.
- The power sources for multiple power supplies of the same type should be on different A/C circuits to protect the unit from a power circuit failure.
- Use dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.
- The site should provide easy access to the ports on the front of the chassis so that you can easily connect and disconnect the network cables, as well as view the unit's LEDs.
- Air flow around the unit and through the side and rear vents should be unrestricted.
- The site should provide a reliable and earth (grounded) power supply source, preferably dedicated and filtered.
- Twisted pair cabling must not be exposed to sources of electrical noise, such as radio transmitters, broadband amplifiers, power lines, electric motors, and fluorescent fixtures.
- Switch ports are suitable for intra-building connections, or where non-exposed cabling is required.
- Do not place objects on top of the switch.
- Do not expose the switch to moisture or water.
- The site should be a dust-free environment.
- The power cords provided with the AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies for 100-125 VAC installations have 20 Amp, 125 V NEMA 5-20P plugs. The plugs are only compatible with NEMA 5-20R receptacles. See Figure 24 on page 63.

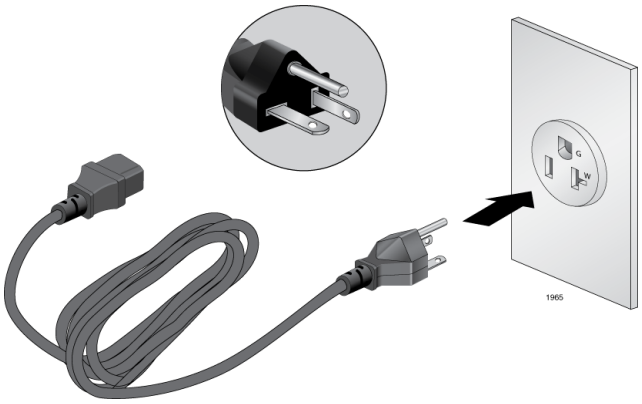


Figure 24. 100 - 125 VAC 125 V NEMA 5-20 Plug and Receptacle

Chapter 3

Installing the Chassis in an Equipment Rack

This chapter describes how to install the AT-SBx8112 Chassis in an equipment rack. This chapter contains the following sections:

- ❒ “Required Tools and Material” on page 66
- ❒ “Preparing the Equipment Rack” on page 67
- ❒ “Unpacking the AT-SBx8112 Chassis” on page 70
- ❒ “Adjusting the Equipment Rack Brackets” on page 72
- ❒ “Installing the AT-SBx8112 Chassis in the Equipment Rack” on page 74
- ❒ “Removing the Shipping Brace” on page 77
- ❒ “Installing the Chassis Grounding Lug” on page 78

Required Tools and Material

Here is a list of the tools and material you need to perform the installation:

- #2 Phillips-head screwdriver
- Crimping tool
- Eight equipment rack screws
- 10 AWG stranded grounding wire
- #2 Phillips-head, 5 inch-lbs torque screwdriver (optional)
- #2 Phillips-head, 10 inch-lbs torque screwdriver (optional)
- #2 Phillips-head, 20 inch-lbs torque screwdriver (optional)

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. E30

Preparing the Equipment Rack

This section explains how to prepare the equipment rack for the chassis. The procedure requires the following items:

- #2 Phillips-head screwdriver (not provided)
- Two equipment rack screws (not provided)

To prepare the equipment rack for the AT-SBx8112 Chassis, perform the following procedure:

Caution
The chassis is heavy and should be mounted as low as possible in the equipment rack to maximize vertical stability.

1. Reserve 311.1 mm (12.25“) of vertical rack space for the installation of the AT-SBx8112 Chassis, as shown in Figure 25 on page 68.

2. Do not mount any other equipment within 152.4 mm (6”) above this space during installation. This additional vertical space is temporary and allows you enough room to lift and tilt the chassis into its position in the equipment rack without hitting other equipment, as shown in Figure 31 on page 75. You may use this additional space for other network equipment after the chassis is installed.

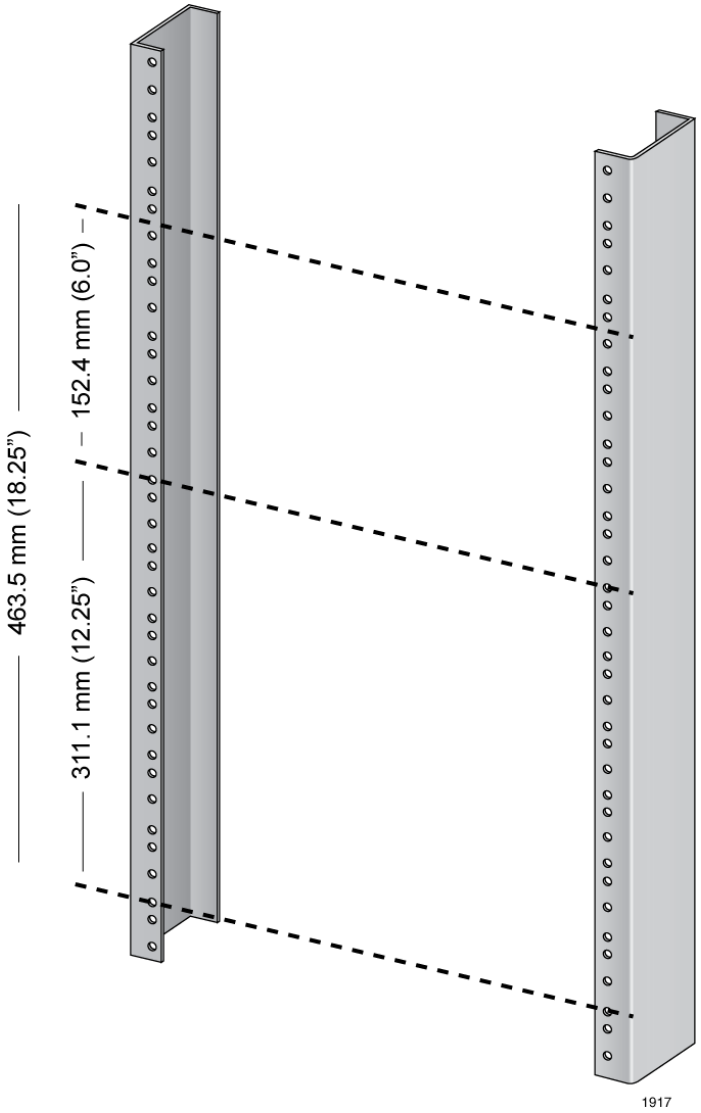


Figure 25. Reserving Vertical Rack Space

3. Identify the lowest 1/2” screw hole pattern on the rack mounting rails within the space reserved for the AT-SBx8112 Chassis.

4. Install one rack mount screw in each vertical rail, at the same height in the top screw hole of the lowest 1/2” hole pattern, as shown in Figure 26. The screws are used to support the chassis while you secure it to the rack. Do not fully tighten these two screws at this time. The screw heads should protrude from the rack approximately 6.4 mm (.25 in).

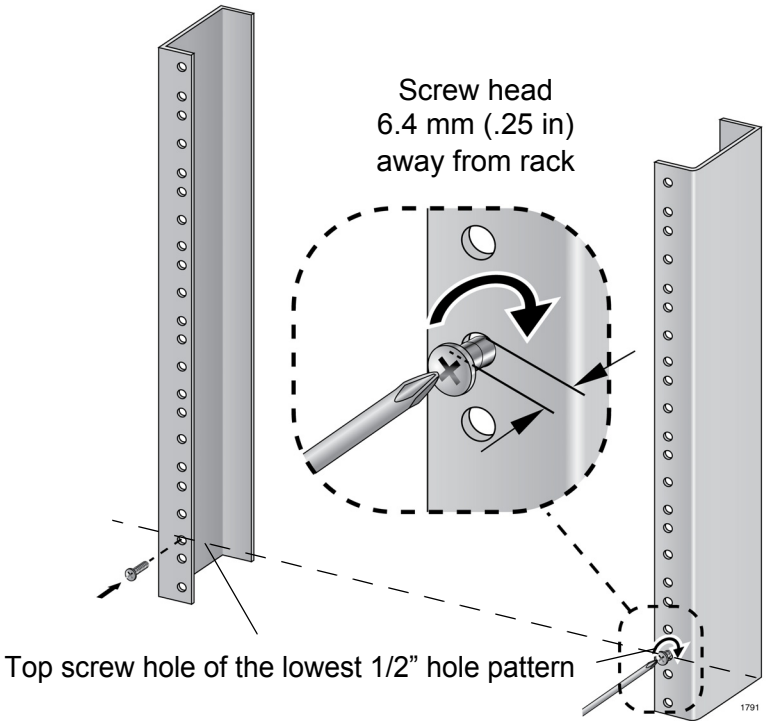


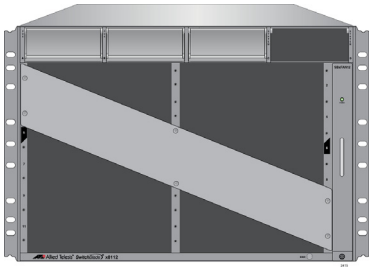
Figure 26. Rack Mounting Hole Locations

5. After installing the two screws in the equipment rack, go to “Unpacking the AT-SBx8112 Chassis” on page 70.

Unpacking the AT-SBx8112 Chassis

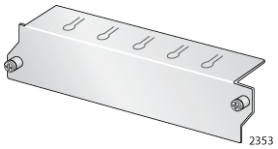
To unpack the AT-SBx8112 Chassis, perform the following procedure:

1. Remove all components from the shipping package.
2. Verify the contents of the shipping container by referring to Figure 27 here and Figure 28 on page 71. If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.

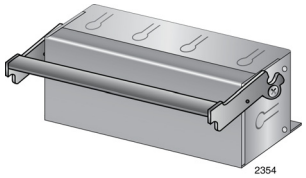


One AT-SBx8112 Chassis

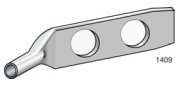
One AT-SBxFAN12 Module pre-installed in the vertical slot on the right side of the front panel



Ten blank line card slot covers

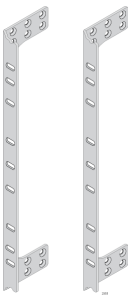


Three blank power supply slot covers pre-installed in power supply slots A to C on the front panel

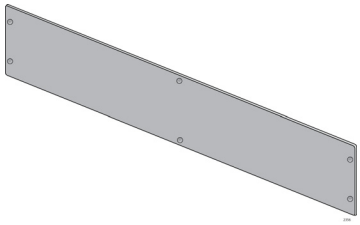


One grounding lug pre-installed in the lower left corner on the back panel

Figure 27. Components of the AT-SBx8112 Chassis



Two equipment rack brackets pre-installed on the sides of the chassis.



One shipping brace pre-installed diagonally across the line card slots on the front panel

Figure 28. Components of the AT-SBx8112 Chassis (Continued)

Adjusting the Equipment Rack Brackets

You may set the position of the chassis relative to the front of the equipment rack by adjusting the two equipment rack brackets that are pre-installed on the sides of the unit. The front of the chassis can be flush with, extend beyond, or be recessed behind the front of the equipment rack. You may also install the chassis so that the rear panel is flush with the front of the equipment rack.

The different bracket positions are listed in Table 18 and illustrated in Figure 29 on page 73 and Figure 30 on page 73. Please review the following information before moving the brackets:

- Position A, the default position, positions the chassis so that the front of the unit is flush with the front of the equipment rack.
- Position B recesses the front of the chassis by 27.39 mm (1.1 in).
- Positions C to E extend the front of the chassis beyond the front of the rack from 27.39 mm (1.1 in) to 140.85 mm (5.545 in).
- Position F installs the chassis with the rear panel flush with the front of the equipment rack.
- To install the rack mount brackets in position “E,” you have to remove the two chassis screws from the bottom-middle section of the chassis and re-install them in front where the rack mount bracket screws were originally, as shown in Figure 29 on page 73.
- The dimension (X) between the front panel and the rack rails is given for each rack mounting bracket position in Table 18.

Table 18. Front Panel to Rack Rail Dimensions

Figure #	Front Panel Position	Dimension X Front Panel to Rack Rail
29	A (Factory Installed - Flush)	3.69 mm (0.145 in)
29	B (Recessed)	-27.39 mm (-1.078 in)
29	C	27.39 mm (1.078 in)
29	D	47.71 mm (1.878 in)
29	E	140.85 mm (5.545 in)
30	F (Reverse Position)	374.16 mm (14.731 in)

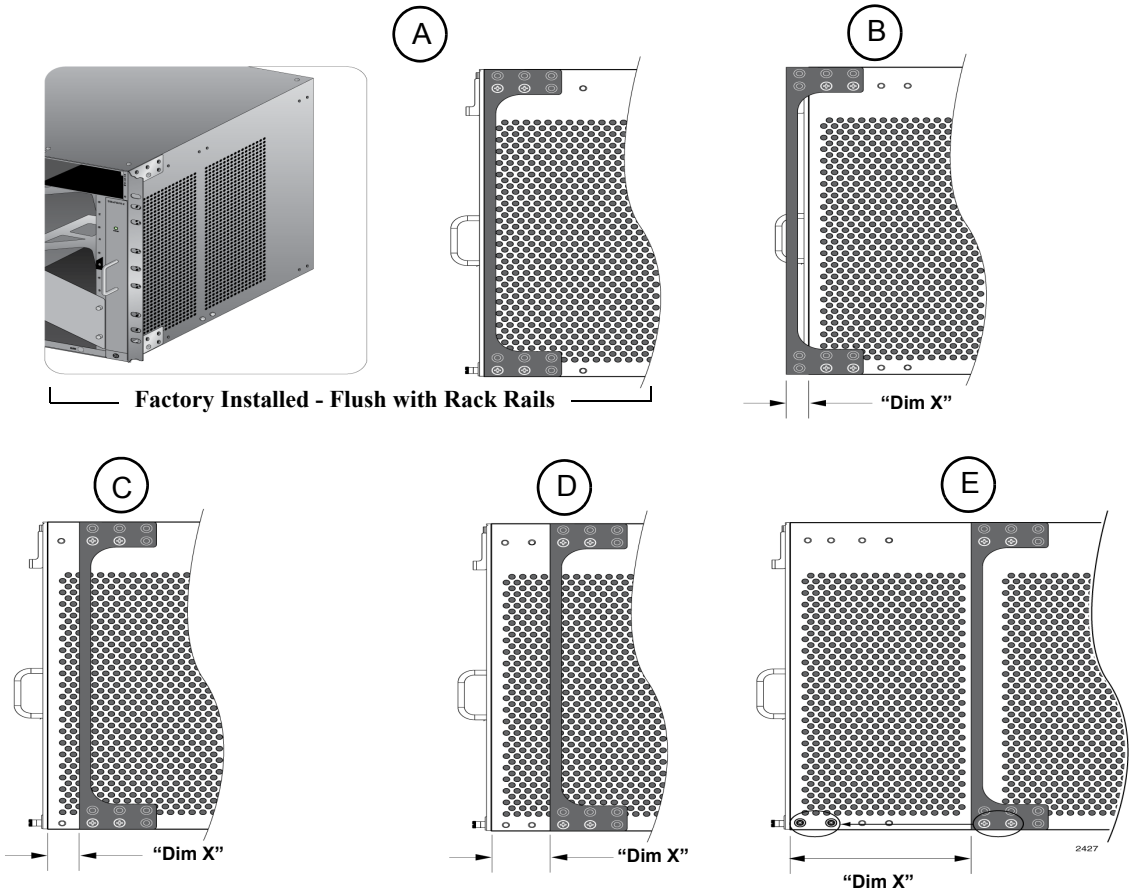


Figure 29. Rack Mounting Bracket Locations

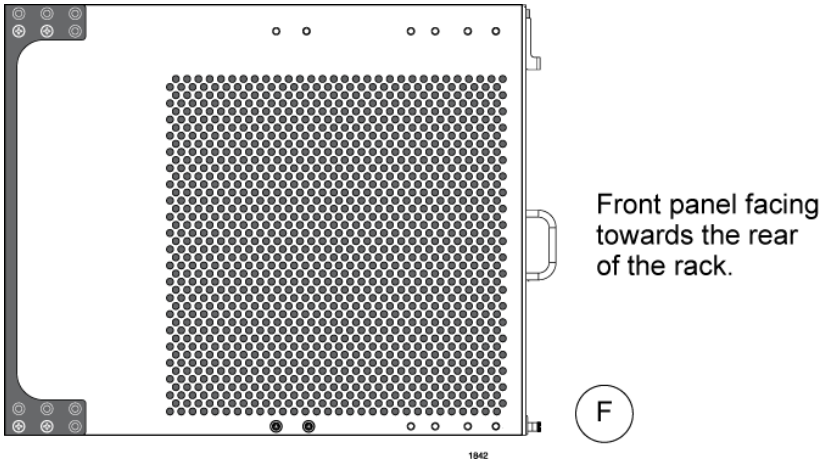


Figure 30. Rack Bracket Locations for Reverse Position of Chassis

Installing the AT-SBx8112 Chassis in the Equipment Rack

The procedure in this section explains how to install the chassis in the equipment rack. The procedure requires the following items:

- #2 Phillips-head screwdriver (not provided)
- Six equipment rack screws (not provided)
- #2 Phillips-head, 10 inch-lbs torque screwdriver (optional — not provided)

Caution
Do not remove the shipping brace from the front of the AT-SBx8112 Chassis until after the unit is securely mounted in the rack. The plate prevents twisting of the chassis frame and mechanical misalignment of the line card slots during shipping and installation.

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. E30

Warning
To prevent injuring yourself or damaging the device, do not attempt to install the chassis in the equipment rack alone. Allied Telesis recommends a minimum of three people for this procedure.

Before installing the chassis in the rack, review the following checklist:

- Did you reserve sufficient space in the equipment rack for the chassis and install two screws in the rack on which to rest the chassis while securing it to the rack? If not, then perform “Preparing the Equipment Rack” on page 67.
- Did you adjust the brackets so that the front of the chassis will be positioned correctly in the equipment rack for your installation? If not, then perform “Adjusting the Equipment Rack Brackets” on page 72.

To install the AT-SBx8112 Chassis in the equipment rack, perform the following procedure:

1. While facing the front of the chassis, tilt the top of the chassis toward you, as shown in Figure 31 on page 75.

2. Lift the AT-SBx8112 Chassis into the equipment rack and set the bottom of the equipment rack brackets firmly on the two equipment rack screws you installed in “Preparing the Equipment Rack” on page 67.

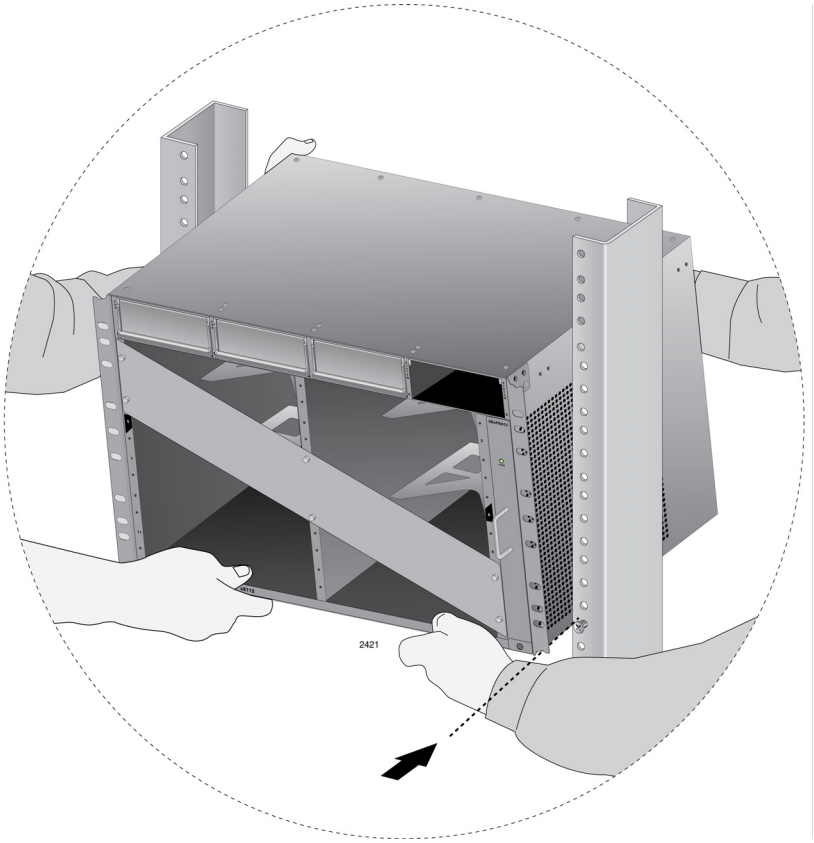


Figure 31. Lifting the AT-SBx8112 Chassis into the Equipment Rack

3. With the bottom of the rack mount ears resting on the two rack mount screws, tilt the top of the chassis back until both rackmount brackets are flush and parallel with the vertical rack rails.

4. Install six rack mount screws (not provided) to secure the chassis to the equipment rack, as shown in Figure 32 on page 76.

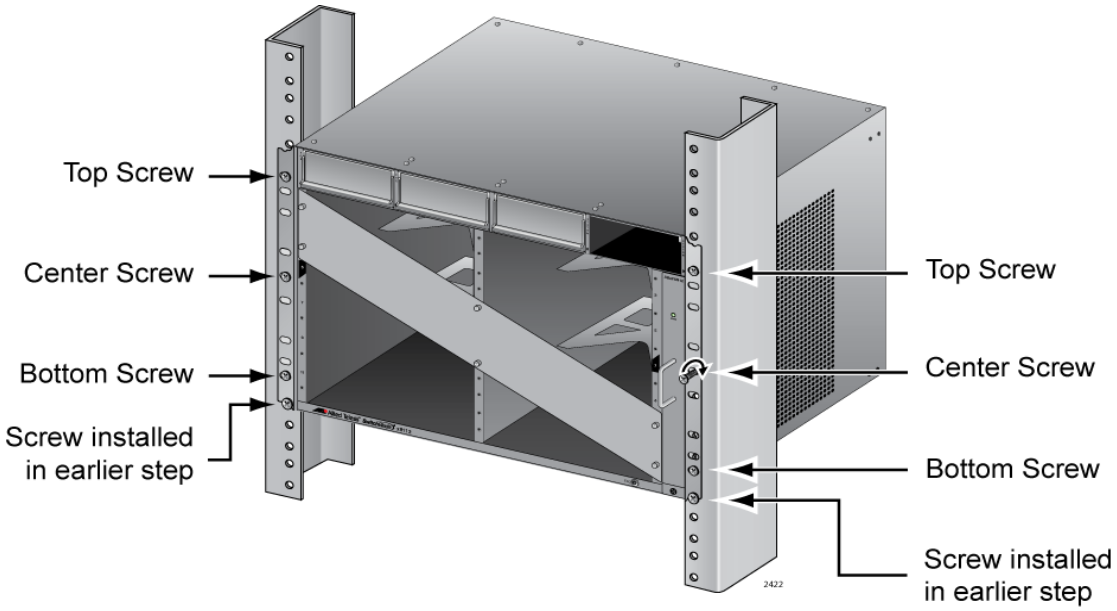


Figure 32. Installing the Rack Mount Screws

5. Tighten all eight screws to secure the chassis to the equipment rack, Allied Telesis recommends tightening the screws to 10 inch-lbs.

6. Go to “Removing the Shipping Brace” on page 77.

Removing the Shipping Brace

Now that the chassis is installed in the equipment rack, you may remove the shipping brace from the front of the unit. To remove the shipping brace, remove the six mounting screws with a #2 Phillips-head screwdriver (not provided).

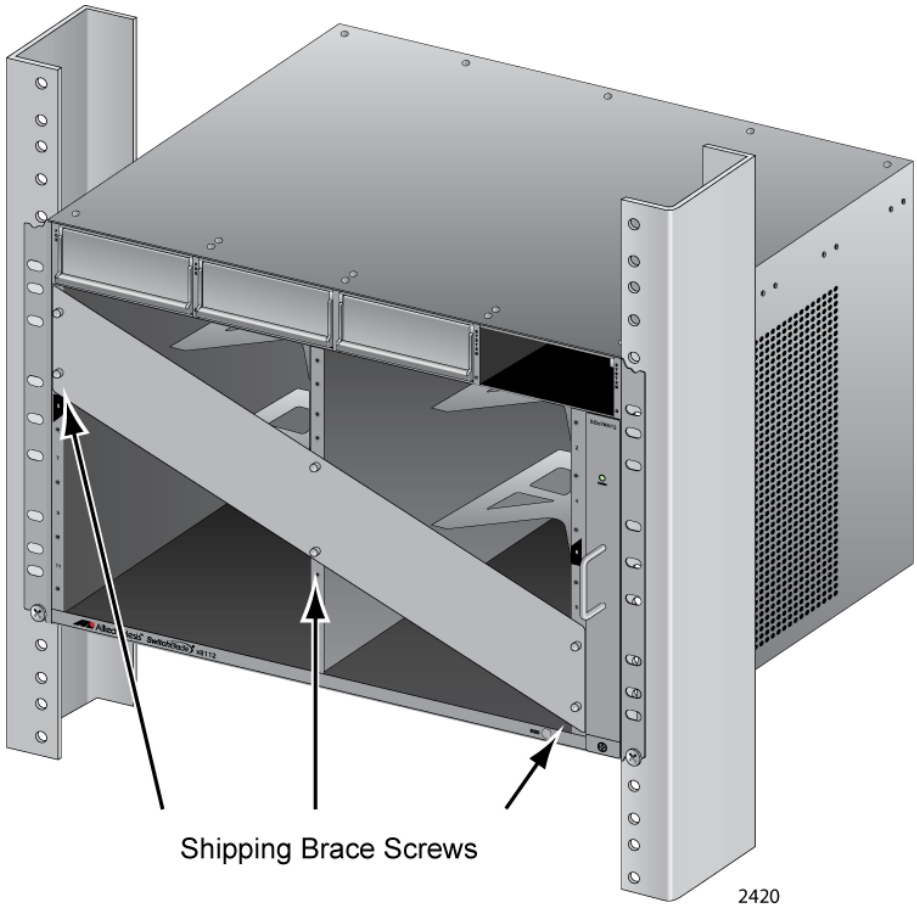


Figure 33. Removing the Shipping Brace

After removing the shipping plate, go to “Installing the Chassis Grounding Lug” on page 78.

Installing the Chassis Grounding Lug

This procedure explains how to connect a grounding wire to the chassis. The chassis requires a permanent connection for the line cards and power supplies to a good earth ground. The procedure requires the following items:

- ❒ Grounding lug (pre-installed on the rear panel of the chassis)
- ❒ #2 Phillips-head screwdriver (not provided)
- ❒ Crimping tool (not provided)
- ❒ 10 AWG stranded grounding wire (not provided)
- ❒ #2 Phillips-head, 20 inch-lbs torque screwdriver (optional — not provided)

To connect the chassis to an earth ground, perform the following procedure:

1. Prepare an adequate length of stranded grounding wire (10 AWG) for the ground connection by stripping it as shown in Figure 34.

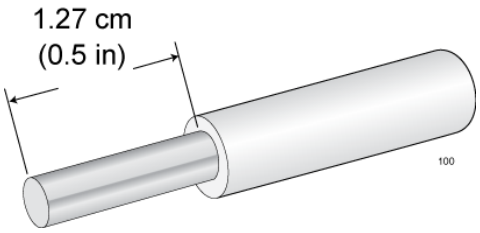


Figure 34. Stripping the Grounding Wire

2. Remove the two screws that secure the grounding lug to the rear panel of the chassis, as shown in Figure 35.

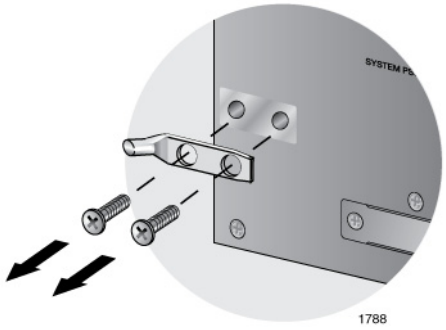


Figure 35. Removing the Grounding Lug

3. Insert one end of the grounding wire into the grounding lug, as shown in Figure 36, and use a crimping tool to secure the wire to the grounding lug.

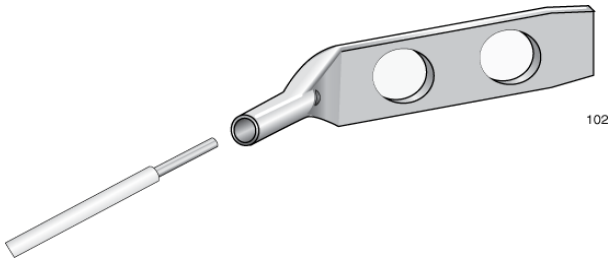


Figure 36. Attaching the Grounding Wire to the Grounding Lug

4. Install the grounding lug on the rear panel of the chassis, as shown in Figure 37. Allied Telesis recommends tightening the screws to 20 inch-lbs.

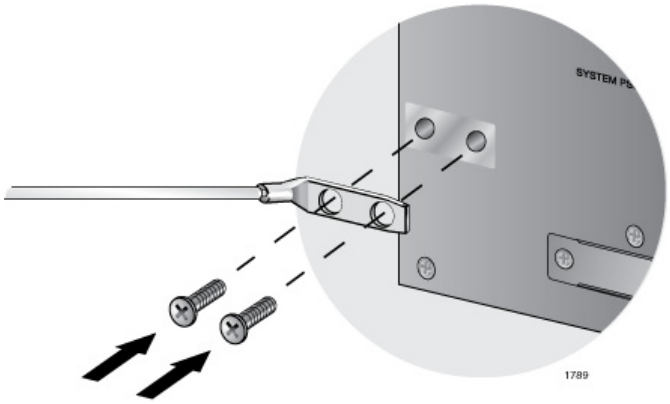


Figure 37. Installing the Grounding Lug and Wire

5. Connect the other end of the grounding wire to the building protective earth.

6. Go to Chapter 4, “Installing the Power Supplies” on page 81.

Chapter 4

Installing the Power Supplies

This chapter explains how to install the power supplies. It has the following sections:

- “Protecting Against Electrostatic Discharge (ESD)” on page 82
- “Installing the AT-SBxPWRSYS1 System Power Supply” on page 83
- “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 89

Protecting Against Electrostatic Discharge (ESD)

To protect the equipment from damage by Electrostatic Discharge (ESD) during the installation procedure, observe proper ESD protection when handling the SwitchBlade x8112 line cards and power supplies. You should be properly grounded with a wrist or foot strap.

Caution
Electrostatic Discharge (ESD) can damage the components on the SwitchBlade x8112 line cards and power supplies. Be sure to follow proper ESD procedures during the installation.

To guard against ESD, perform this procedure:

1. Verify that the chassis is electrically connected to earth ground.
2. Wear an ESD-preventive device such as a foot strap or wrist strap, ensuring that it makes good contact with the user's skin.

   If a foot strap is used, the floor must be ESD conductive.
3. Connect the clip from the ESD-preventative device to the ESD socket on the lower right side of the AT-SBx8112 Chassis front panel, as shown in Figure 38, or an unpainted surface of the frame or rack. This ensures that ESD voltages safely flow to ground.

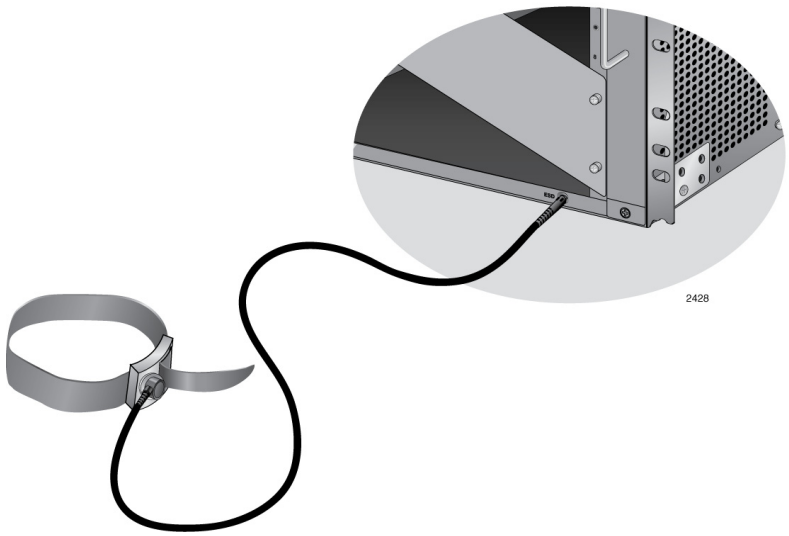


Figure 38. ESD Socket

Installing the AT-SBxPWRSYS1 System Power Supply

For background information on the AT-SBxPWRSYS1 Power Supply, refer to “AT-SBxPWRSYS1 Power Supply” on page 49. The chassis must have at least one AT-SBxPWRSYS1 Power Supply.

Warning
The electronic components in the AT-SBxPWRSYS1 Power Supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 82 to guard against ESD damage when unpacking and installing the power supply.

To install the AT-SBxPWRSYS1 Power Supply, perform the following procedure:

1. Choose a slot for the AT-SBxPWRSYS1 Power Supply in the chassis.

   You may install it in either slot C and D, shown in Figure 39. The first AT-SBxPWRSYS1 Power Supply should be installed in slot D, because the slot does not have a blank power supply panel.

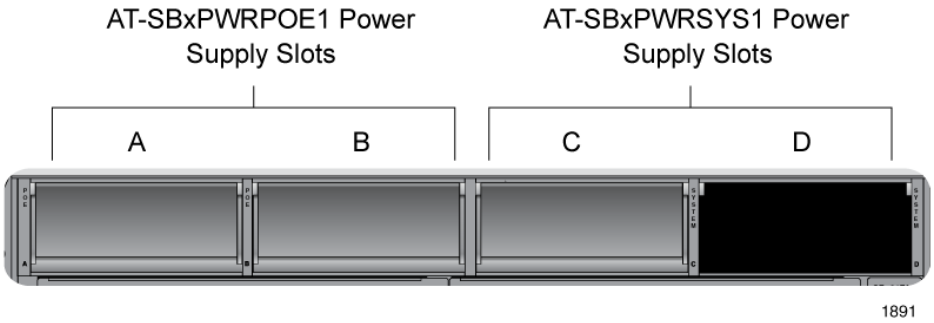


Figure 39. Power Supply Slots

Caution
The AT-SBxPWRSYS1 Power Supply will not work in slot A or B.

2. If the chassis already has a power supply in slot D, remove the blank power supply panel from slot C by lifting the blank panel handle and sliding it out of the slot, as shown in Figure 40 on page 84.

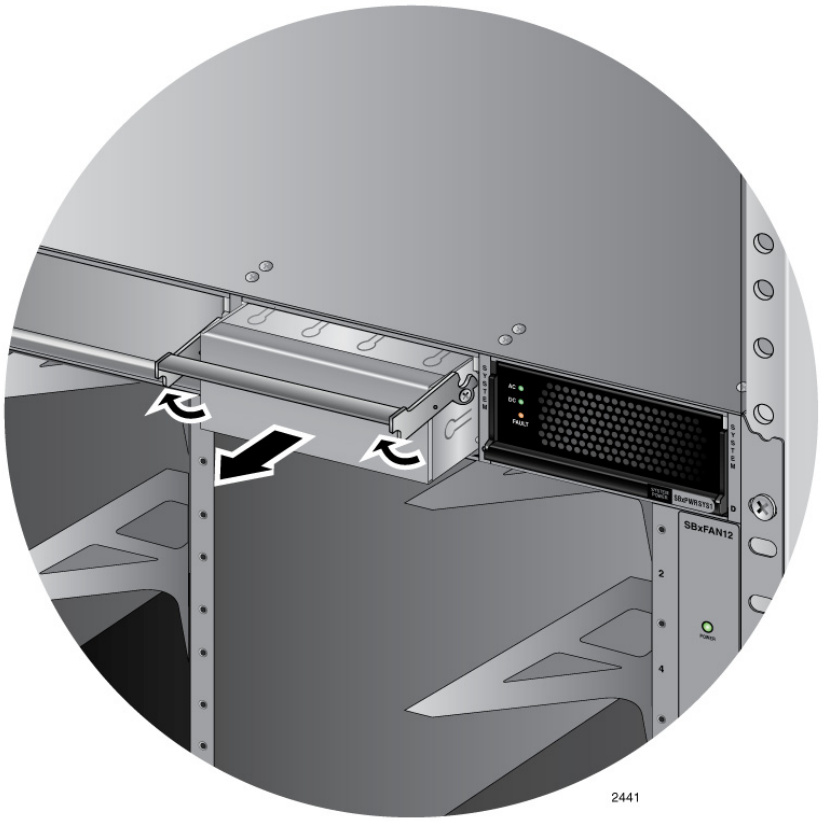
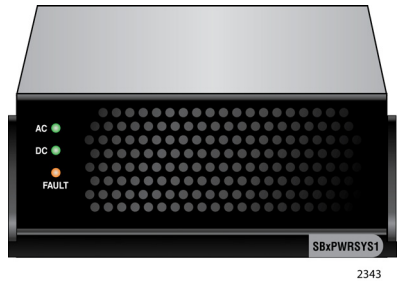


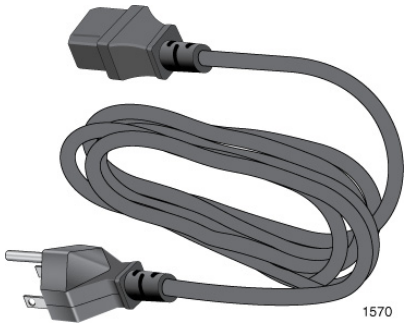
Figure 40. Removing the Blank Slot Cover from Power Supply Slot C

3. Remove the new AT-SBxPWRSYS1 Power Supply from the shipping package and verify the package contents, listed in Figure 41 on page 85.

   If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBxPWRSYS1 Power Supply Module



One regional AC power cord

One tie wrap

Figure 41. Items Included with the AT-SBxPWRSYS1 Power Supply Module

Note
Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

Note
The tie wrap is used to secure the power cord to the chassis, as explained in “Applying A/C Power to the AT-SBxPWRSYS1 Power Supplies” on page 129.

4. Check the power supply for its model name, shown in Figure 42, to verify the module.

   If the module is the AT-SBxPWRPOE1 PoE Power Supply, do not continue with this procedure. Instead, perform “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 89.

Figure 42. Verifying the AT-SBxPWRSYS1 Power Supply

5. Move the locking handle on the AT-SBxPWRSYS1 Power Supply to the unlocked or up position. See Figure 43.

Figure 43. Unlocking the Handle on the AT-SBxPWRSYS1 Power Supply

6. Align and insert the AT-SBxPWRSYS1 Power Supply into the power supply slot. Figure 44 shows the power supply installed in slot D.

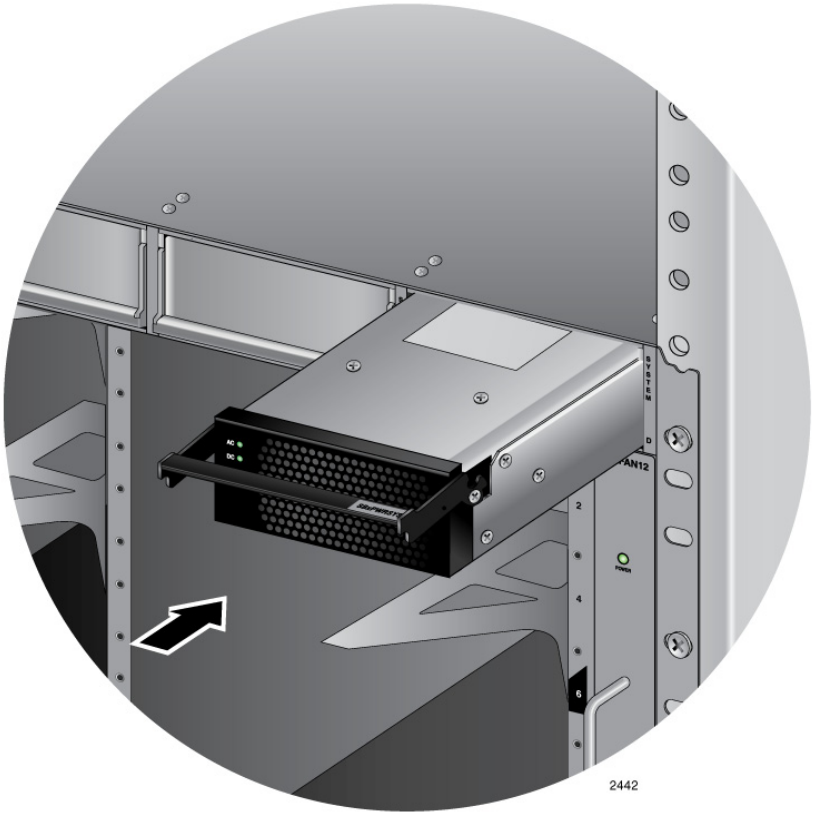


Figure 44. Inserting the AT-SBxPWRSYS1 Power Supply

7. Lower the power supply locking handle to secure the power supply to the chassis, as shown in Figure 45.

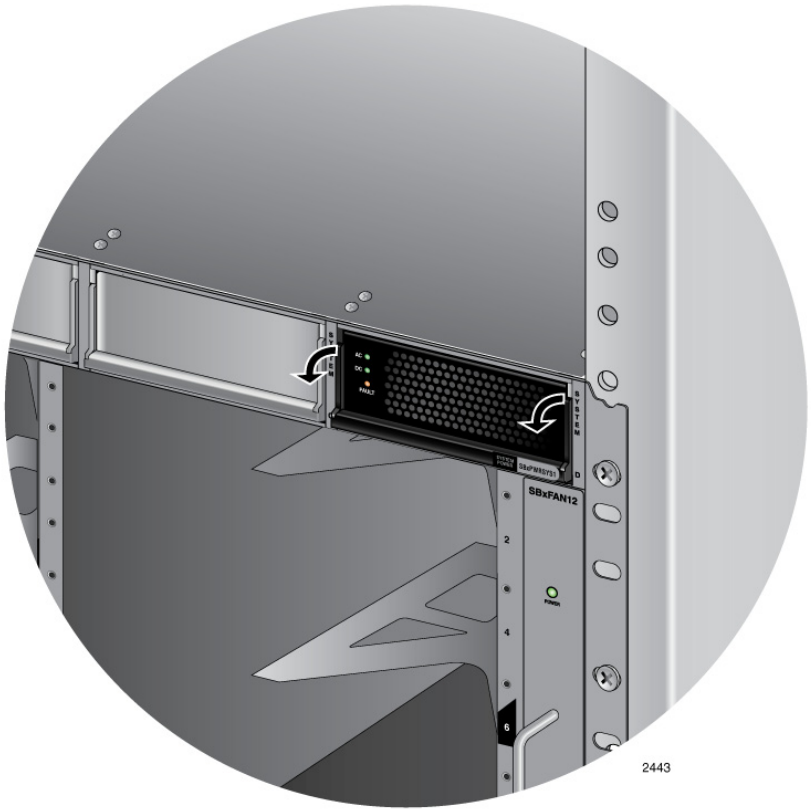


Figure 45. Lowering the Handle on the AT-SBxPWRSYS1 Power Supply

8. To install a second AT-SBxPWRSYS1 Power Supply, repeat this procedure.

After installing the AT-SBxPWRSYS1 Power Supples, do one of the following:

- If you purchased the AT-SBxPWRPOE1 Power Supply for the ports on the AT-SBx81GP24 PoE Line Cards, go to “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 89.
- Otherwise, go to Chapter 5, “Installing the AT-SBx81CFC400 Control Card and Ethernet Line Cards” on page 95.

Note
Retain the tie wrap that comes with the power supply. You will use it to secure the power cord to the chassis when you power on the unit in “Applying A/C Power to the AT-SBxPWRSYS1 Power Supplies” on page 129.

Installing the AT-SBxPWRPOE1 PoE Power Supply

This section contains the installation procedure for the AT-SBxPWRPOE1 Power Supply, for the PoE+ ports on the AT-SBx81GP24 PoE Line Card. For background information, refer to “AT-SBxPWRPOE1 Power Supply” on page 51.

Caution

The electronic components in the AT-SBxPWRPOE1 PoE Power Supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 82 to guard against ESD damage when unpacking and installing the power supply.

To install the power supply, perform the following procedure:

1. Choose a slot for the AT-AT-SBxPWRPOE1 System Power Supply in the chassis.

   You may install it in either slot A or B, shown in Figure 46.

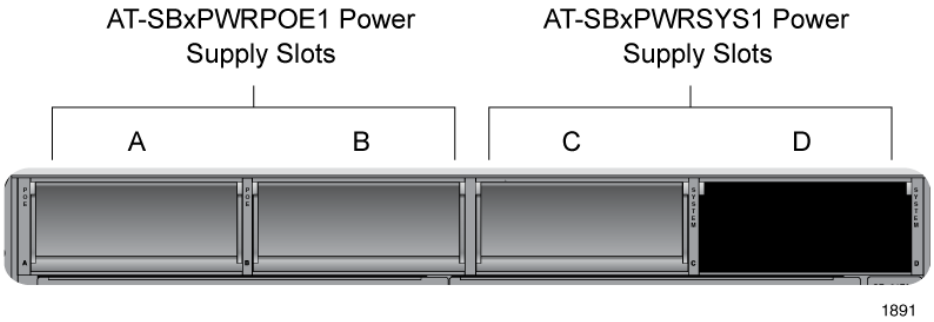


Figure 46. Power Supply Slots

2. Raise the handle on the blank panel covering the selected slot and slide the panel from the chassis, as shown in Figure 47 on page 90.

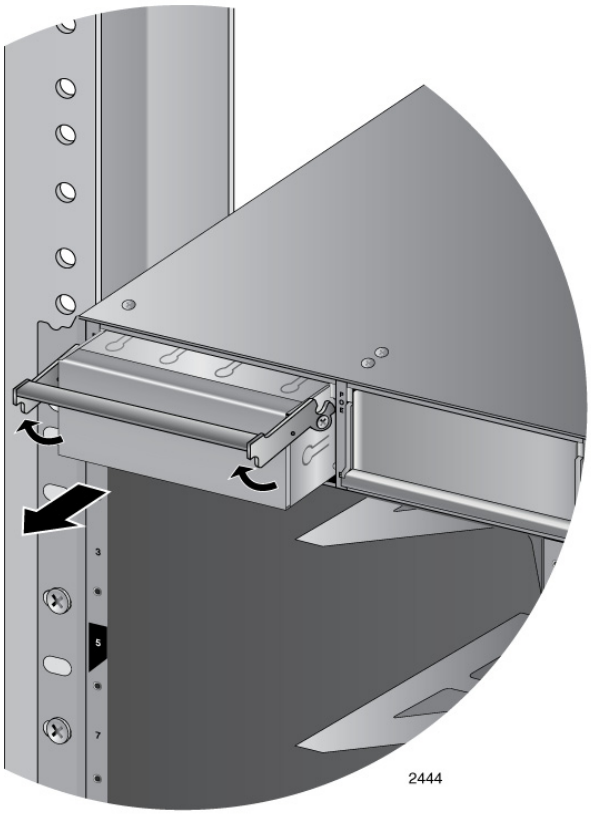
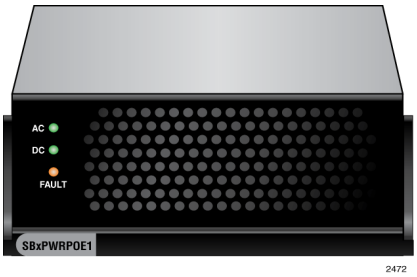


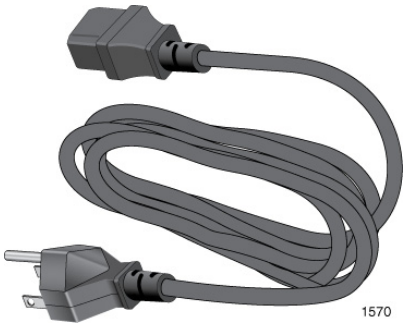
Figure 47. Removing the Blank Slot Cover from Power Supply Slot A

3. Remove the power supply from the shipping package and verify that the shipping package contains the items listed in Figure 48 on page 91.

   If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBxPWRPOE1 Power Supply Module



One regional AC power cord

One tie wrap

Figure 48. Items Included with the AT-SBxPWRPOE1 Power Supply Module

Note
Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

Note
The tie wrap is used to secure the power cord to the chassis, as explained in “Applying A/C Power to the AT-SBxPWRPOE1 Power Supplies” on page 132.

4. Check the model name, shown in Figure 49, to verify the module.

   If the module is the AT-SBxPWRSYS1 System Power Supply, do not continue with this procedure. Instead, perform “Installing the AT-SBxPWRSYS1 System Power Supply” on page 83.

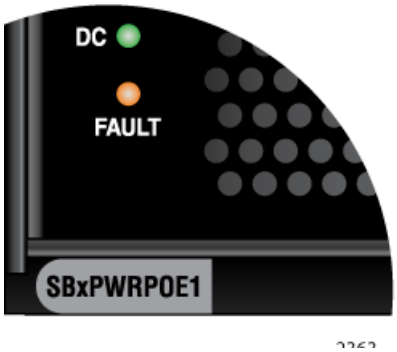


Figure 49. Verifying the AT-SBxPWRPOE1 PoE Power Supply

5. Raise the locking handle on the AT-SBxPWRPOE1 Power Supply, as shown Figure 50.

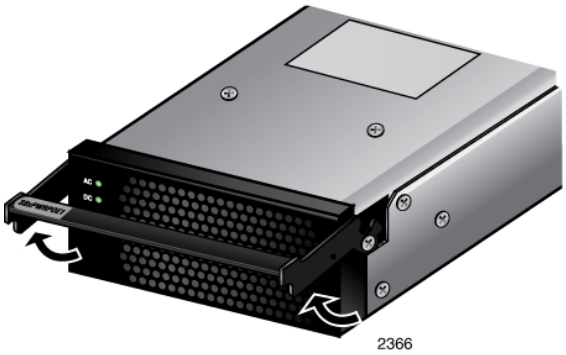


Figure 50. Unlocking the Handle on the AT-SBxPWRPOE1 Power Supply

6. Align and insert the AT-SBxPWRPOE1 Module into slot A or B. See Figure 51 on page 93.

Caution
The AT-SBxPWRPOE1 Power Supply will not work in slot C or D.

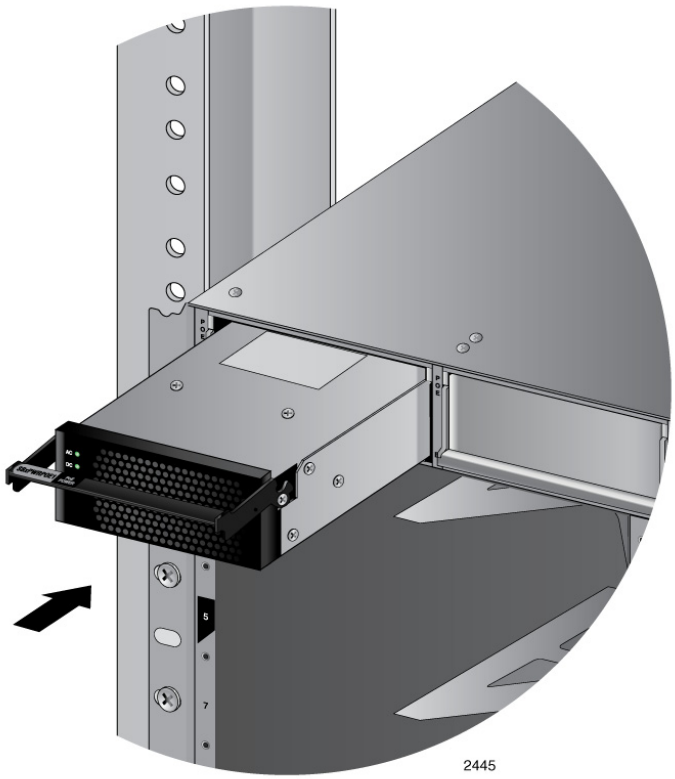


Figure 51. Inserting the AT-SBxPWRPOE1 Power Supply

7. Lower the locking handle of the power supply module to secure the module in the slot, as shown in Figure 52.

Figure 52. Locking the Handle on the AT-SBxPWRPOE1 Power Supply

8. To install a second AT-SBxPWRPOE1 Power Supply, repeat this procedure.

9. After installing the AT-SBxPWRPOE1 Power Supplies, go to Chapter 5, “Installing the AT-SBx81CFC400 Control Card and Ethernet Line Cards” on page 95.

Note
Retain the tie wrap that comes with the power supply. You will use it to secure the power cord to the chassis when you power on the unit in “Applying A/C Power to the AT-SBxPWRPOE1 Power Supplies” on page 132.

Chapter 5

Installing the AT-SBx81CFC400 Control Card and Ethernet Line Cards

This chapter describes how to install the control and Ethernet line cards. The chapter has the following sections:

- “Installing the AT-SBx81CFC400 Controller Fabric Card” on page 96
- “Installing the Ethernet Line Cards” on page 102
- “Installing the Blank Slot Covers” on page 106

Installing the AT-SBx81CFC400 Controller Fabric Card

This section contains the installation procedure for the AT-SBx81CFC400 Controller Fabric Card. You may install either one or two controller cards in the unit. The chassis must have at least one controller card. The cards must be installed in slots 5 and 6 in the chassis.

Caution

The electronic components on the AT-SBx81CFC400 Card can be damaged by electro-static discharge (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 82 to guard against ESD damage when unpacking and installing the card.

This procedure requires the following tools:

- #2 Phillips-head screwdriver (not provided)
- #2 Phillips-head, 5 inch-lbs torque screwdriver (optional — not provided))

To install the AT-SBx81CFC400 Card, perform the following procedure:

1. Choose a slot in the chassis for the AT-SBx81CFC400 Controller Fabric Card.

   The card must be installed in slot 5 or 6, shown in Figure 53. If you are installing only one controller card, Allied Telesis recommends installing it in slot 5.

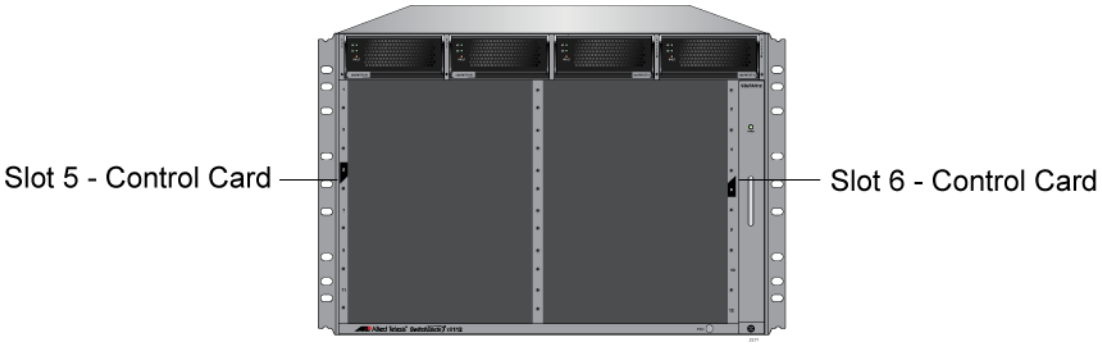
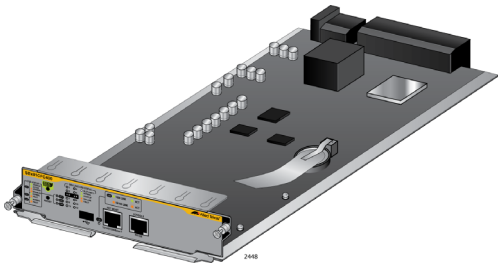


Figure 53. Slots 5 and 6 for the AT-SBx81CFC400 Card

2. Remove the new AT-SBx81CFC400 Control Card from the shipping package and verify the package contents, listed in Figure 54 on page 97.

   If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBx81CFC400 Control Card

One 2 m (6.6 ft) local management cable with RJ-45 (8P8C) and DB-9 (D-sub 9-pin) connectors.

Figure 54. Items Included with the AT-SBx81CFC400 Controller Card

Note
Store the packaging material in a safe location. You should use the original shipping material if you need to return the unit to Allied Telesis.

3. Move the locking handles on the front panel to the open position, as shown in Figure 55.

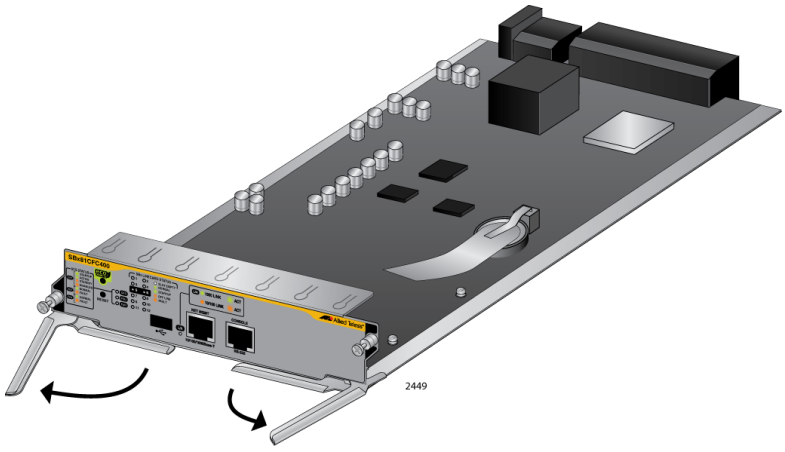


Figure 55. Opening the Locking Handles on the AT-SBx81CFC400 Controller Fabric Card

4. Remove the battery insulator tab on the controller card by sliding it out from between the battery and battery clip, as shown in Figure 56 on page 98.

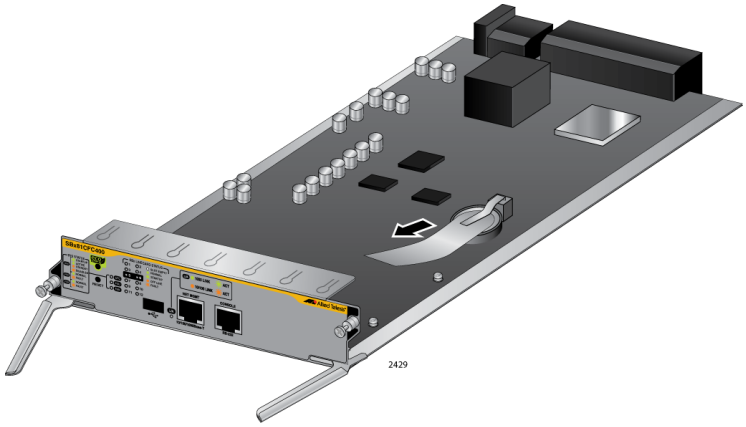


Figure 56. Removing the Battery Insulator

5. Align the edges of the AT-SBx81CFC400 Controller Fabric Card with the internal chassis card guides in slot 5 or 6 of the AT-SBx8112 Chassis. Figure 57 shows the AT-SBx81CFC400 Card aligned in slot 5.

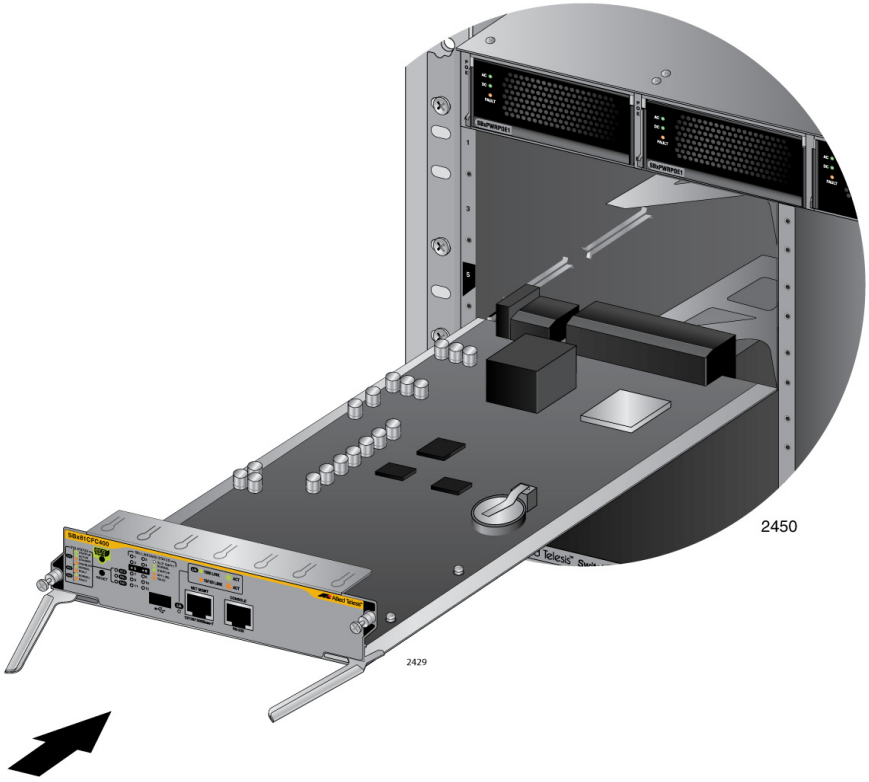


Figure 57. Aligning the AT-SBx81CFC400 Card in the Chassis Slot

6. Insert the card into the slot until you feel it make contact with the connector on the chassis backplane, as shown in Figure 58.

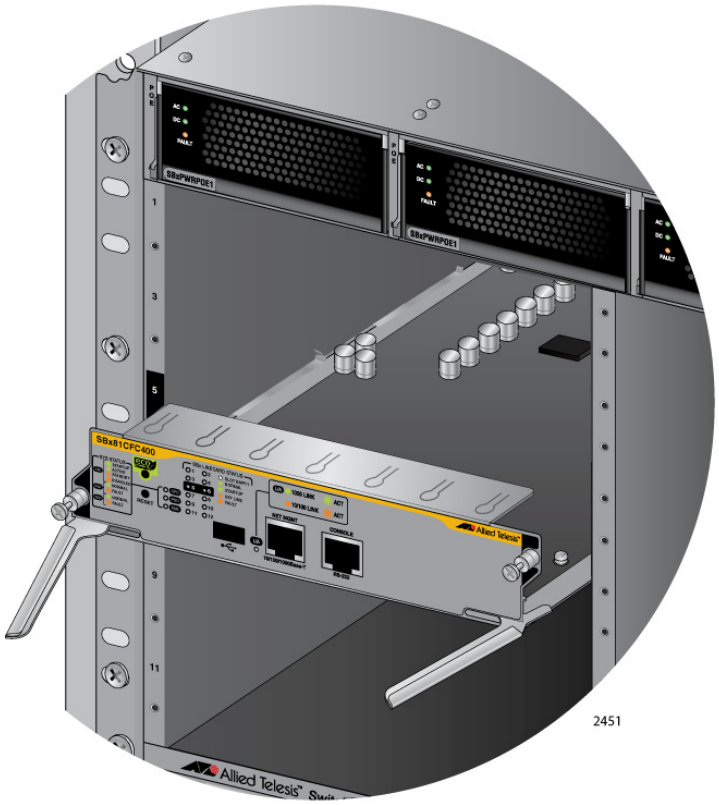


Figure 58. Inserting the AT-SBx81CFC400 Card in the Chassis Slot

Caution

Forcing the AT-SBx81CFC400 Card into its chassis slot when it is not properly aligned with the card guides may damage the backplane connector pins inside the chassis. If there is undue resistance, remove the card. Check to be sure that it is properly aligned with the card guides when sliding it into the chassis.

7. Secure the controller card to the chassis by closing the two locking levers on the front panel of the card, as shown in Figure 59 on page 100.

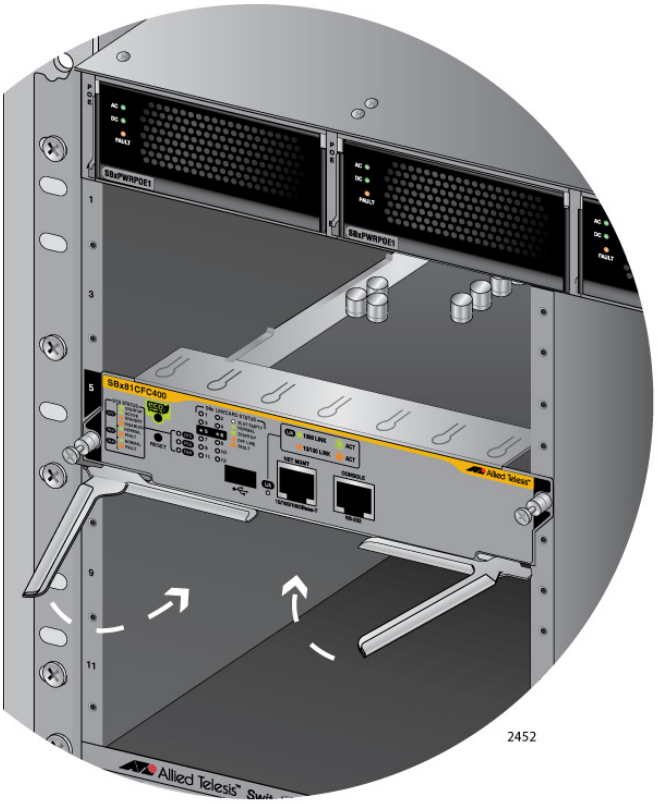


Figure 59. Closing the Locking Levers on the AT-SBx81CFC400 Controller Fabric Card

8. Finger tighten the two thumbscrews on the card to secure the card to the chassis, as shown in Figure 60 on page 101.

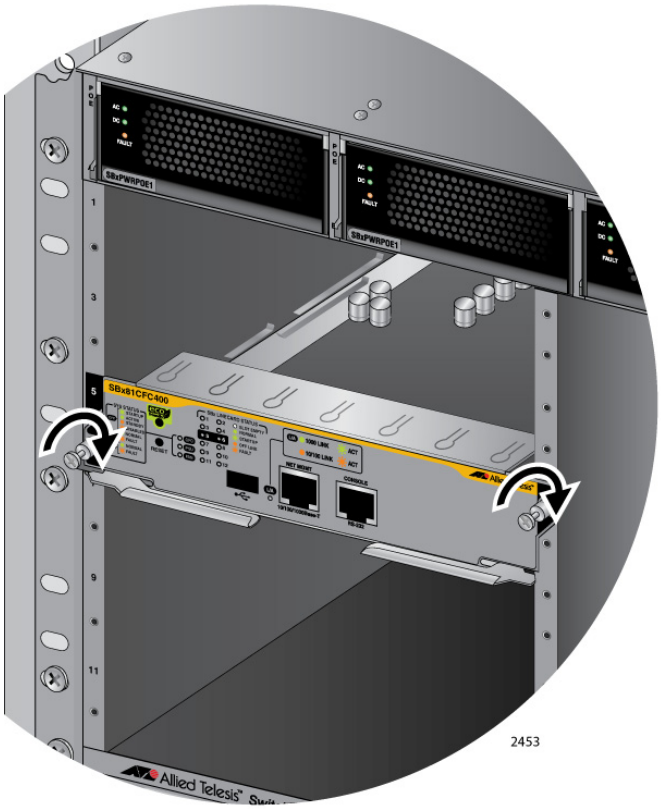


Figure 60. Tightening the Thumb Screws on the AT-SBx81CFC400 Card

9. Tighten the screws with a # 2 Phillips-head screwdriver to secure the controller card to the chassis.

   Allied Telesis recommends tightening the screws to 5 inch-lbs.

10. if you have a second AT-SBx81CFC400 Controller Fabric Card, repeat steps 1 to 9 to install it in the chassis.

11. Go to “Installing the Ethernet Line Cards” on page 102.

Installing the Ethernet Line Cards

This section contains the installation procedure for the Ethernet line cards. The illustrations show the AT-SBx81GP24 Line Card, but the procedure is the same for all the cards.

Caution
The electronic components on the line cards can be damaged by electro-static discharges (ESD). Follow the procedure in "Protecting Against Electrostatic Discharge (ESD)" on page 82 to guard against ESD damage when unpacking and installing the line cards.

This procedure requires the following tools:

- #2 Phillips-head screwdriver (not provided)
- #2 Phillips-head, 5 inch-lbs torque screwdriver (optional — not provided)

To install the Ethernet line cards, perform the following procedure:

1. Choose a slot in the chassis for the Ethernet line card. The Ethernet line cards may be installed in slots 1 to 4 and 7 to 12. The slots are shown in Figure 61.

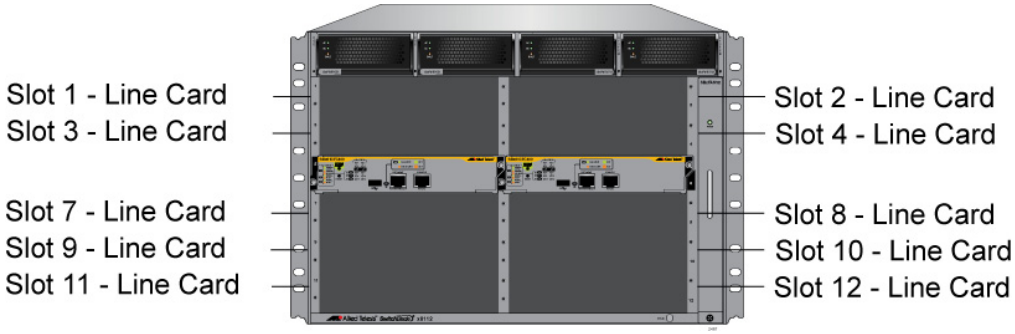

Slot 1 - Line Card
Slot 3 - Line Card
Slot 7 - Line Card
Slot 9 - Line Card
Slot 11 - Line Card
Slot 2 - Line Card
Slot 4 - Line Card
Slot 8 - Line Card
Slot 10 - Line Card
Slot 12 - Line Card

Figure 61. Slots 1 to 4 and 7 to 12 for the Ethernet Line Cards

2. Remove the line card from the shipping package. If it is missing or damaged, contact your Allied Telesis sales representative for assistance.

Note
Store the packaging material in a safe location. You should use the original shipping material if you need to return the unit to Allied Telesis.

3. Align the line card with the internal chassis card guides in the selected slot in the chassis.

   Figure 62 shows an Ethernet line card aligned with slot 1.

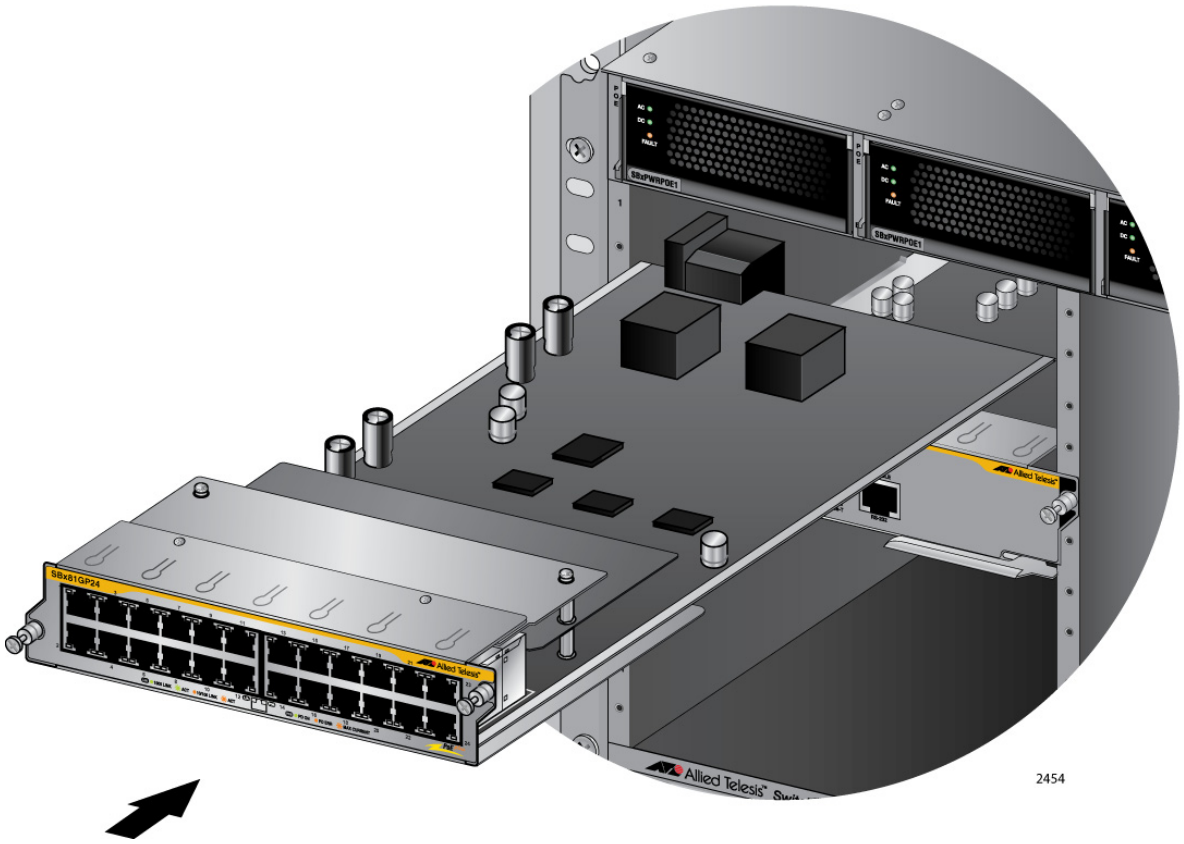


Figure 62. Aligning an Ethernet Line Card in a Chassis Slot

4. Insert the line card into the slot, as shown in Figure 63 on page 104, until the faceplate is firmly seated against the chassis front panel.

Caution

Forcing the line card into its chassis slot when it is not properly aligned with the card guides may damage the backplane connector pins inside the chassis. If there is undue resistance, remove the line card. Check to insure that it is properly aligned with the card guides.

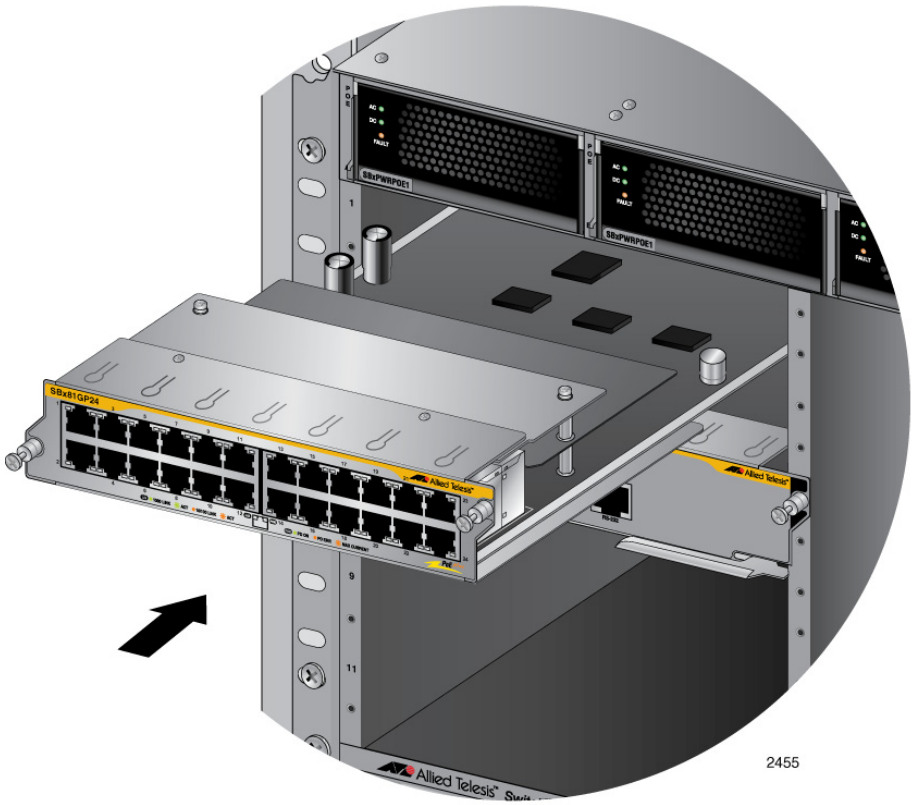


Figure 63. Inserting an Ethernet Line Card

5. Finger tighten the two thumbscrews on each side of the line card to secure it to the chassis, as shown in Figure 64 on page 105.

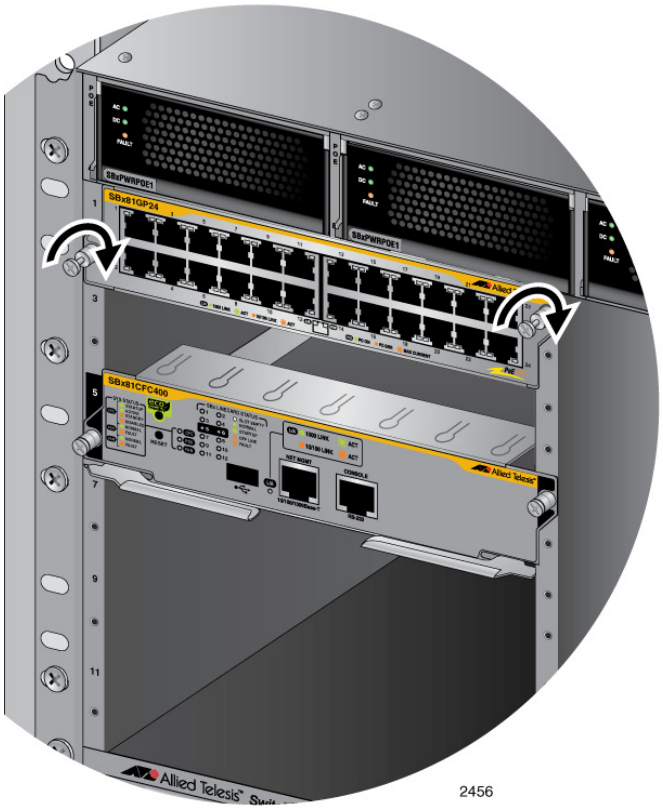


Figure 64. Tightening the Thumb Screws on an Ethernet Line Card

6. Tighten the two screws with a # 2 Phillips-head screwdriver to secure the line card to the chassis.

   Allied Telesis recommends tightening the screws to 5 inch-lbs.

7. Repeat this procedure to install the remaining Ethernet line cards.

8. After installing the line cards. go to “Installing the Blank Slot Covers” on page 106.

Installing the Blank Slot Covers

After installing the AT-SBx81CFC400 Control Cards and Ethernet line cards, check the front panel for any unused slots and cover them with the blank slot covers included with the chassis, as explained in this procedure. The fan module may not be able to maintain adequate airflow across the control and line cards if the chassis is not completely enclosed. If there are no unused slots, go to Chapter 6, “Installing the Transceivers and Cabling the Ports” on page 109.

To install the blank panels on the unused slots, perform the following procedure:

1. Position a blank slot cover over an unused slot, as shown in Figure 65.

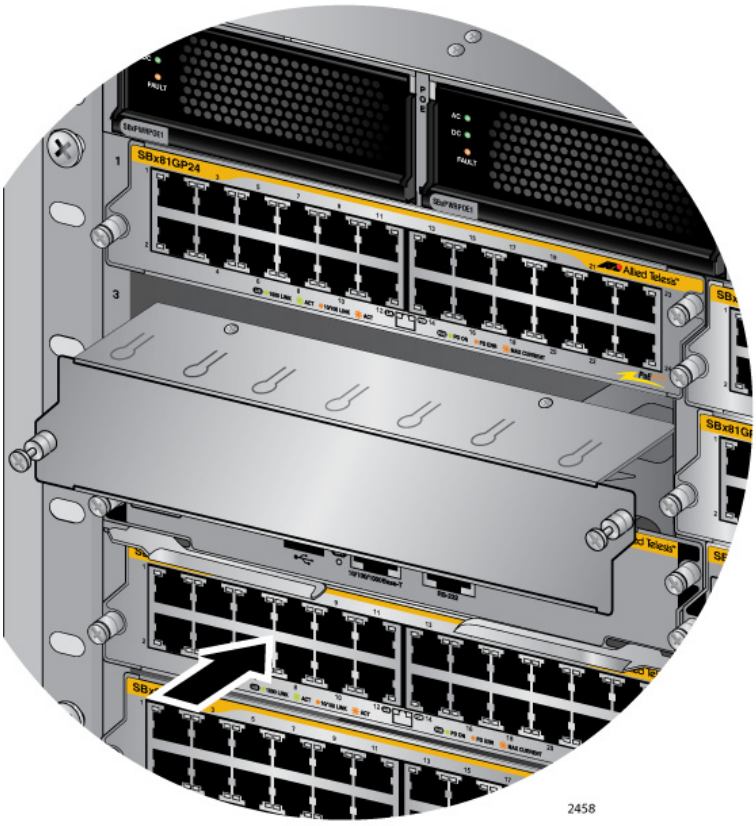


Figure 65. Installing a Blank Slot Cover

2. Finger tighten the two thumbscrews to attach the blank panel to the chassis, as shown in Figure 66 on page 107.

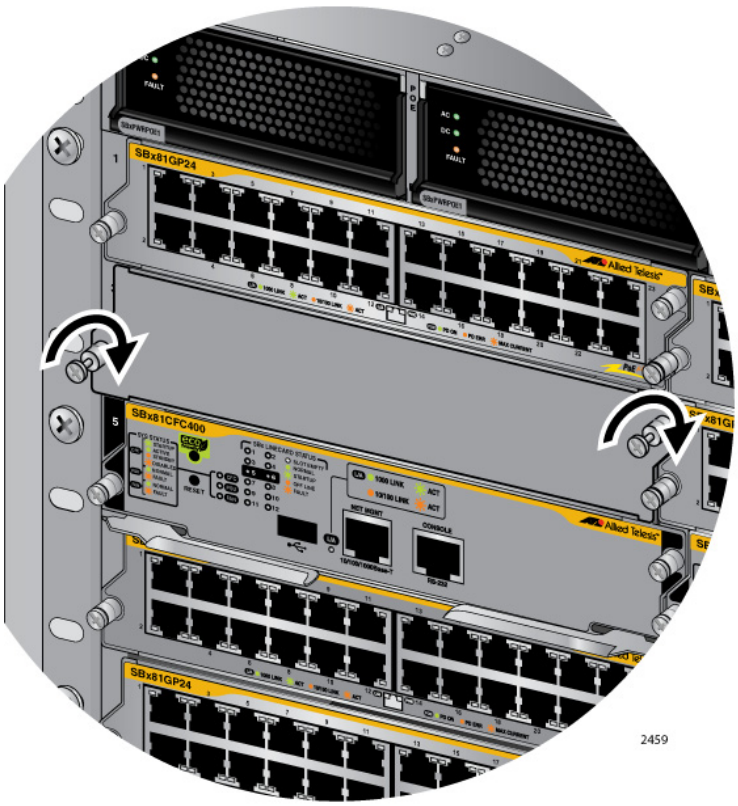


Figure 66. Tightening the Thumbscrews on a Blank Slot Cover

3. Tighten the two screws with a # 2 Phillips-head screwdriver to secure the blank slot cover to the chassis.

   Allied Telesis recommends tightening the screws to 5 inch-lbs.

4. Repeat this procedure to cover the remaining empty slots with blank slot covers.

5. Store any unused blank panels in a secure location for future use.

6. Go to Chapter 6, “Installing the Transceivers and Cabling the Ports” on page 109.

Chapter 6

Installing the Transceivers and Cabling the Ports

This chapter describes how to install the fiber optic transceivers and attach the cables to the ports on the line cards. The chapter has the following sections:

- “Cabling Guidelines for the Twisted Pair Ports on the AT-SBx81GP24 and AT-SBx81GT24 Line Cards” on page 110
- “Guidelines to Installing SFP and SFP+ Transceivers” on page 112
- “Installing SFP Transceivers in the AT-SBx81GS24a Line Card” on page 113
- “Installing SFP+ Transceivers in the AT-SBx81XS6 Line Card” on page 117
- “Installing AT-SP10TW Cables in the AT-SBx81XS6 Line Card” on page 121
- “Cabling the NET MGMT Port on the AT-SBx81CFC400 Card” on page 124

Cabling Guidelines for the Twisted Pair Ports on the AT-SBx81GP24 and AT-SBx81GT24 Line Cards

Here are the guidelines to cabling the 10/100/1000Base-T twisted pair ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards:

- The cable specifications for the 10/100/1000Base-T twisted pair ports on the AT-SBx81GT24 Line Card are listed in Table 1 on page 30.
- The cable specifications for the 10/100/1000Base-T twisted pair ports on the AT-SBx81GP24 Line Card are listed in Figure 2 on page 30.
- The connectors on the cables should fit snugly into the ports, and the tabs should lock the connectors into place.
- The default setting for PoE on the ports on the AT-SBx81GP24 Line Card is enabled.
- The default speed setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation.
- The default speed setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have fixed speeds or 10 or 100 Mbps. For those switch ports, disable Auto-Negotiation and set the port's speed manually to match the speeds of the network devices.
- The 10/100/1000Base-T ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.
- The default duplex mode setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have a fixed duplex mode. Disable Auto-Negotiation on those ports and set their duplex modes manually to avoid the possibility of duplex mode mismatches. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.
- The default wiring configuration of the ports is automatic MDIX detection, which configures the MDI/MDIX setting automatically. This setting is appropriate for switch ports that are connected to network devices that also support the feature.

- The default wiring configuration of automatic MDIX detection is not appropriate for ports that are connected to network devices that do not support the feature. On those ports, you should disable automatic MDIX detection and set the wiring configuration manually with the POLARITY command.

Guidelines to Installing SFP and SFP+ Transceivers

Please review the following guidelines before installing fiber optic transceivers in the AT-SBx81GS24a and AT-SBx81XS6 Line Cards:

- You should install a transceiver in a line card before connecting its network cable.
- A fiber optic transceiver is dust sensitive. Always keep the protective cover in the optical bores when a fiber optic cable is not installed, or when you store the transceiver. When you do remove this cover, retain it for future use.
- Your Allied Telesis sales representative can provide you with a list of supported transceivers for the line cards.
- The operational specifications and fiber optic cable requirements of the transceivers are provided in the documents included with the devices.
- The SFP and SFP+ transceivers and AT-SP10TW cables are hot-swappable. You may install them while the chassis is powered on.
- Unnecessary removal or insertion of transceivers can lead to premature failures.

Warning
Transceivers can be damaged by static electricity. Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 82 to guard against ESD damage when unpacking and installing the devices.

Caution
The temperature of an operational transceiver may exceed 70 C (158 F). Exercise caution when removing or handling a transceiver with unprotected hands.

Installing SFP Transceivers in the AT-SBx81GS24a Line Card

Please review the information in “Guidelines to Installing SFP and SFP+ Transceivers” on page 112 before performing this procedure.

To install SFP transceivers in AT-SBx81GS24a Line Cards, perform the following procedure:

1. Remove the transceiver from its shipping container and store the packaging material in a safe location.

2. Remove the dust cover from the SFP slot chosen for the transceiver, as shown in Figure 67.

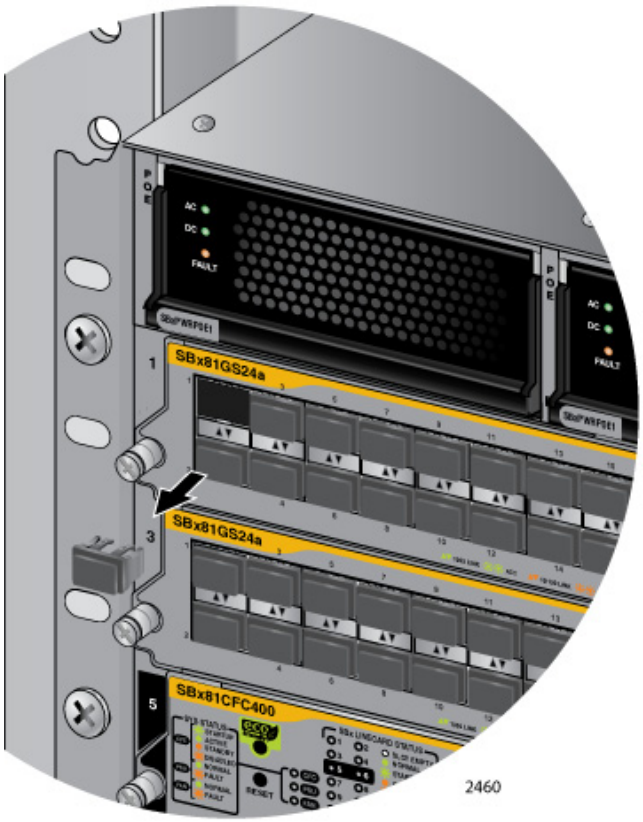


Figure 67. Removing the Dust Cover from an SFP Slot in the AT-SBx81GS24a Line Card

3. To install the transceiver in an SFP slot on the top row of the line card, orient the transceiver with the handle on top, as shown in Figure 68. To install it into a slot on the bottom row of the line card, orient it with the handle on the bottom.

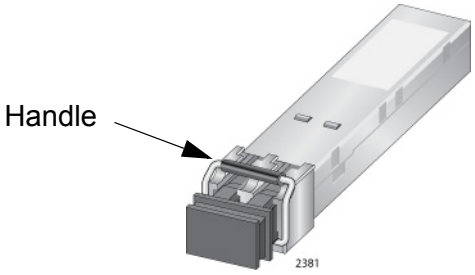


Figure 68. Handle on SFP Transceiver

4. Slide the transceiver into the slot until it clicks into place, as shown in Figure 69.

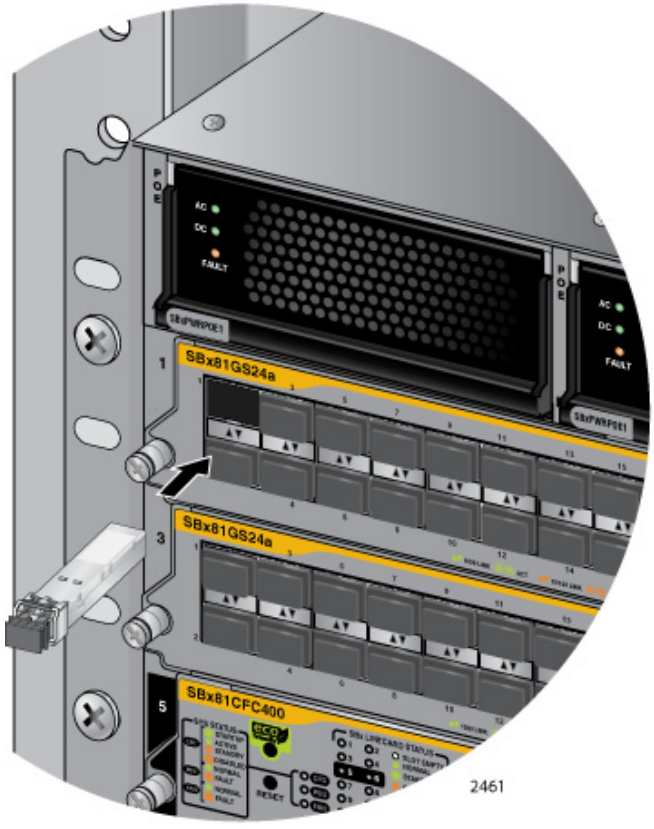


Figure 69. Inserting the SFP Transceiver in the AT-SBx81GS24a Line Card

Note
If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 4 to install the remaining SFP transceivers in the line cards.

5. Remove the protective cover from the SFP transceiver, as shown in Figure 70.

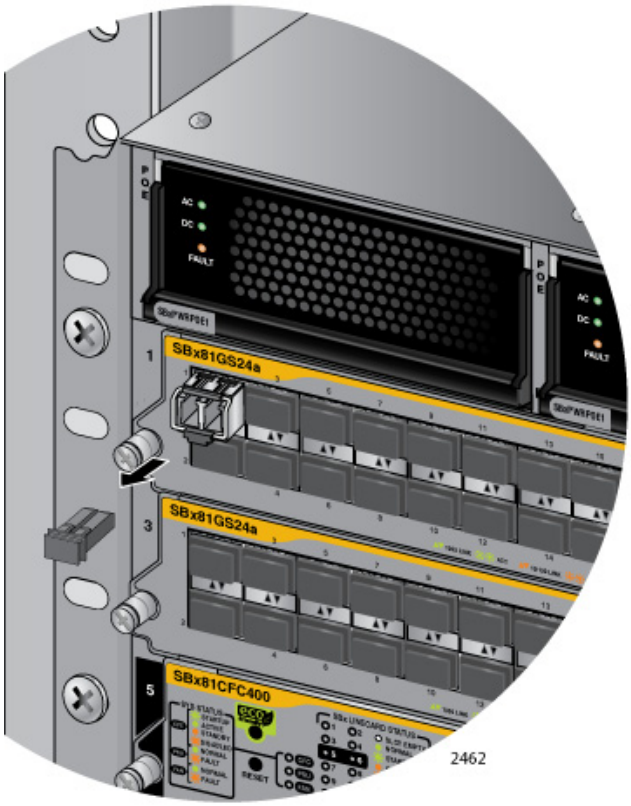


Figure 70. Removing the Dust Cover from the SFP Transceiver in the AT-SBx81GS24a Line Card

Note
The dust cover protects the fiber optic port on the SFP transceiver from dust contamination. It should not be removed until you are ready to connect the fiber optic cable.

6. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 71. The connector should snap into the port.

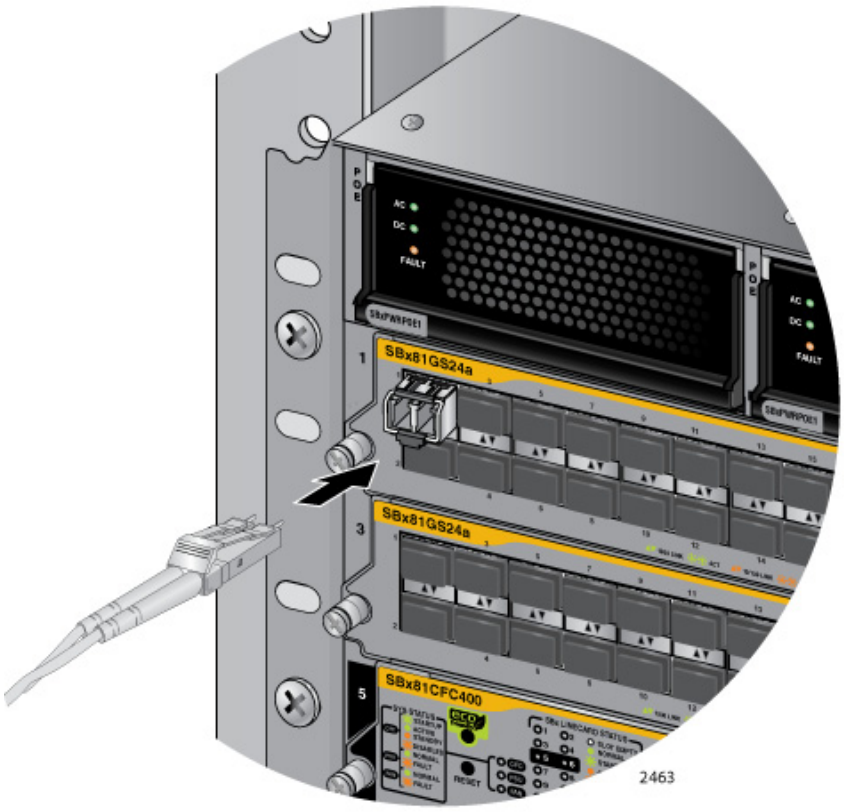


Figure 71. Attaching a Fiber Optic Cable to an SFP Transceiver in the AT-SBx81GS24a Line Card

7. Repeat this procedure to install additional SFP transceivers.

After installing and cabling the SFP transceivers, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 7, “Powering On the Chassis” on page 127.

Installing SFP+ Transceivers in the AT-SBx81XS6 Line Card

Please review the information in “Guidelines to Installing SFP and SFP+ Transceivers” on page 112 before performing this procedure.

To install 10 Gbps SFP+ transceivers in the AT-SBx81XS6 Line Card, perform the following procedure:

1. Remove the dust plug from the slot chosen for the SFP+ transceiver, as shown in Figure 72.

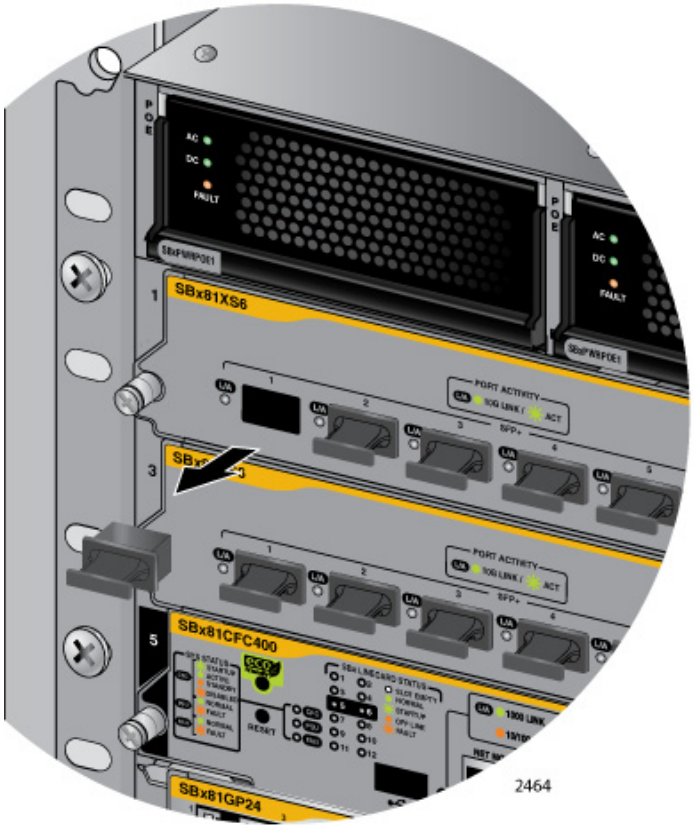


Figure 72. Removing the Dust Cover From an SFP+ Slot in the AT-SBx81XS6 Line Card

Note
Do not remove the dust plug from the SFP+ slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

2. Orient the SFP+ transceiver with the handle on top, as shown in Figure 73 on page 118.

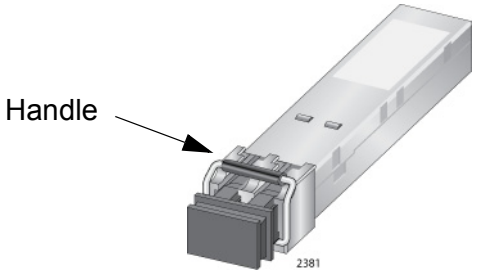


Figure 73. Handle on SFP+ Transceiver

3. Slide the transceiver into the slot until it clicks into place, as shown in Figure 74.

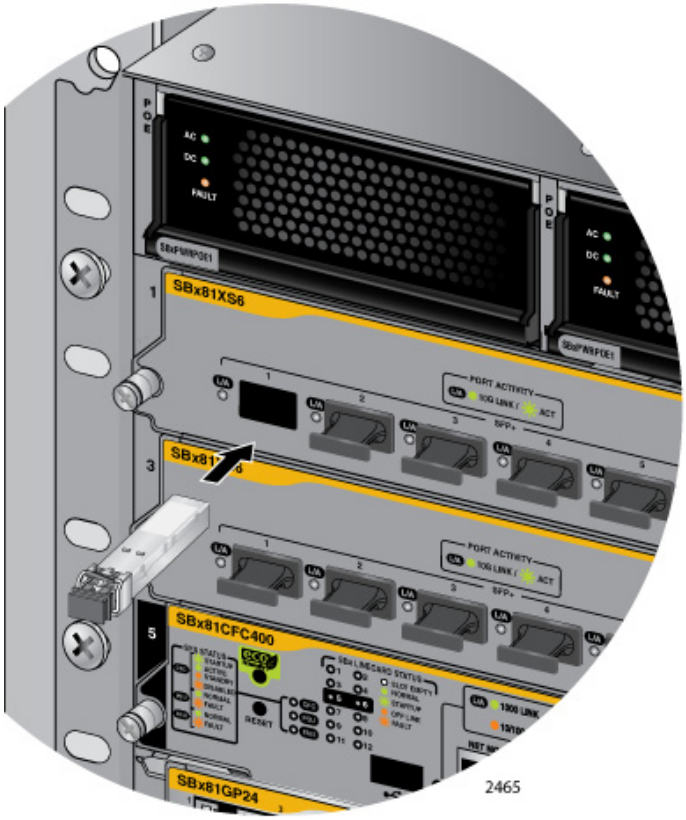


Figure 74. Installing an SFP+ Transceiver in the AT-SBx81XS6 Line Card

Note
If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 3 to install the remaining SFP transceivers in the line cards.

4. Remove the protective cover from the SFP transceiver, as shown in Figure 75.

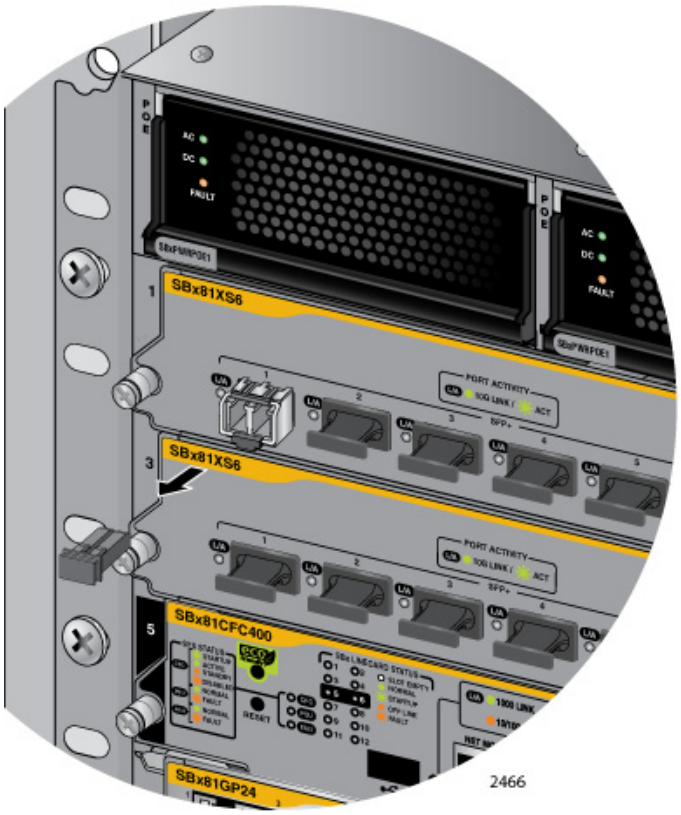


Figure 75. Removing the Dust Cover from an SFP+ Transceiver in the AT-SBx81XS6 Line Card

Note
The dust cover protects the fiber optic port on the SFP transceiver from dust contamination. It should not be removed until you are ready to connect the fiber optic cable.

5. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 76. The connector should snap into the port.

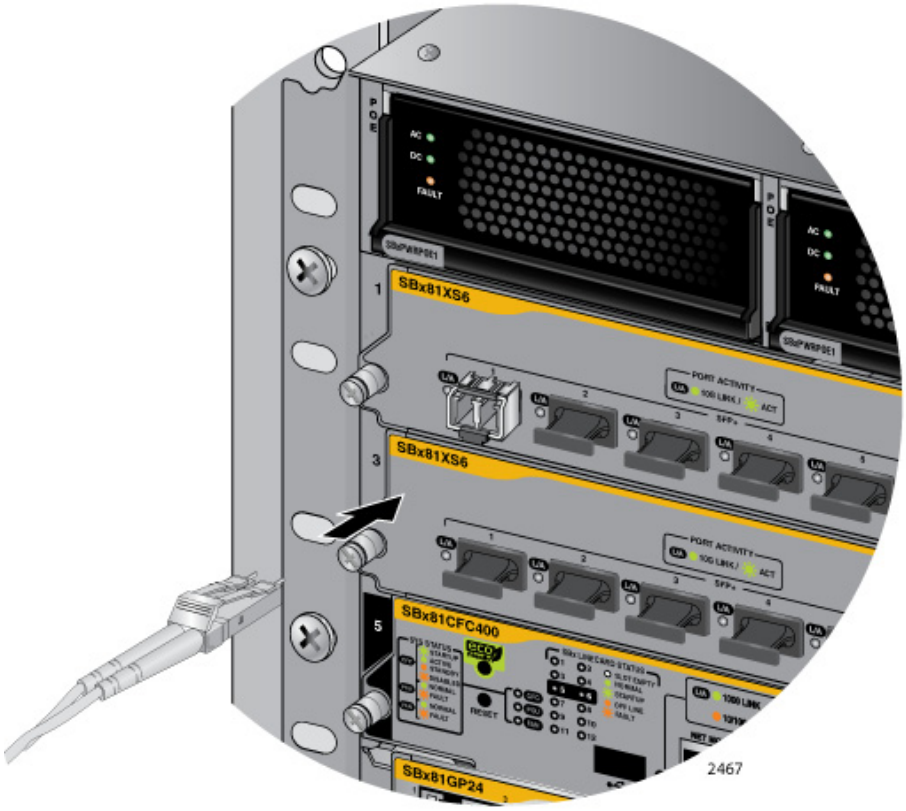


Figure 76. Attaching a Fiber Optic Cable to an SFP+ Transceiver in the AT-SBx81XS6 Line Card

6. Repeat this procedure to install additional SFP plus transceivers in the AT-SBx81XS6 Line Cards.

After installing and cabling the SFP+ transceivers, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 7, “Powering On the Chassis” on page 127.

Installing AT-SP10TW Cables in the AT-SBx81XS6 Line Card

This procedure explains how to connect AT-SP10TW Cables to the AT-SBx81XS6 Line Card. The cables may be used in place of fiber optic cables and transceivers for 10 Gbps links of up to 7 meters.

Note
The AT-SP10TW Cable is only supported in the AT-SBx81XS6 Line Card. It is not supported in the AT-SBx81GS24a Line Card.

To install the AT-SP10TW Cable, perform the following procedure:

1. Remove the dust plug from the SFP+ slot chosen for the cable, as shown in Figure 77.

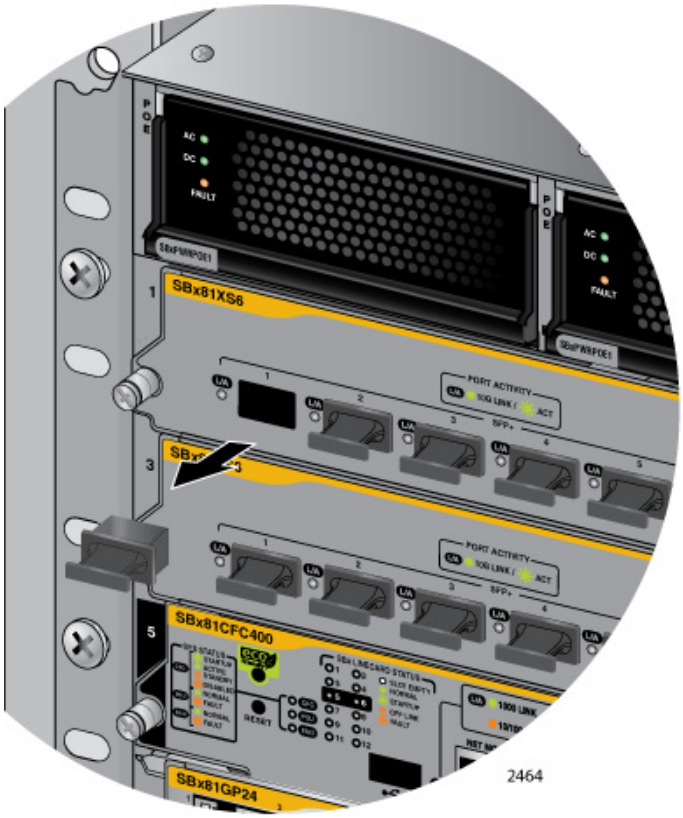


Figure 77. Removing the Dust Cover From an SFP+ Slot in the AT-SBx81XS6 Line Card

Note
Do not remove the dust plug from the SFP+ slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

2. Orient the connector on the AT-SP10TW cable so that the release tab is on top, as shown in Figure 78.

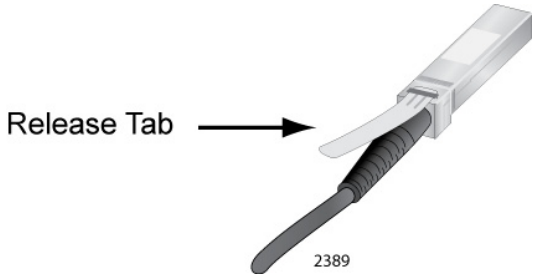


Figure 78. Release Tab on the AT-SBx81XS6 Line Card

3. Slide the connector into the slot until it clicks into place, as shown in Figure 79.

Figure 79. Installing the AT-SP10TW Cable in the AT-SBx81XS6 Line Card

4. Install the other end of the cable into an SFP+ slot on another network device.

5. Repeat this procedure to install additional AT-SP10TW Cables.

> **Note**
> To remove the connector and cable from the SFP+ slot, gently push on the connector, pull on the release tab, and then slide the connector from the slot.

After installing the AT-SP10TW Cables in the AT-SBx81XS6 Line Card, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 7, “Powering On the Chassis” on page 127.

Cabling the NET MGMT Port on the AT-SBx81CFC400 Card

The controller card must have access to your network to perform the management features in Table 11 on page 45. You can give the controller card access to your network either by configuring the Inband Interface, which enables the card to use the backplane and Ethernet line cards to communicate with your network, or by connecting the NET MGMT port to a network device, such as a switch or router. (For instructions on how to configure the Inband Interface, refer to the *Software Reference for SwitchBlade x8100 Series Switches*.)

Here are the guidelines to using the NET MGMT port:

- You may connect the NET MGMT port to a switch, router, media converter, workstation, or other network device.
- The cabling requirements of the port are the same as the ports on the AT-SBx81GT24 Line Card, in Table 1 on page 30.
- If the chassis has two AT-SBx81CFC400 Controller Fabric Cards, you may connect the NET MGMT ports on the active and standby master controller cards to the same network device or different devices.
- The default speed setting for the port is Auto-Negotiation. This setting is appropriate if the port is connected to a network device that also support Auto-Negotiation.
- The default speed setting of Auto-Negotiation is not appropriate if the port is connected to a network device that does not support Auto-Negotiation and has a fixed speed or 10 or 100 Mbps. In this situation, disable Auto-Negotiation and set the port's speed manually to match the speed of the network device.
- The port must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- The default duplex mode setting for the port is Auto-Negotiation. This setting is appropriate if the port is connected to a network device that also support Auto-Negotiation for the duplex mode.
- The default duplex mode setting of Auto-Negotiation is not appropriate if the port is connected to a network device that does not support Auto-Negotiation and has a fixed duplex mode. In this situation, you should disable Auto-Negotiation on the port and set its duplex mode manually to avoid the possibility of a duplex mode mismatch. With Auto-Negotiation, the port defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.
- The default wiring configuration of the port is automatic MDIX detection, which configures the MDI/MDIX setting automatically.

This setting is appropriate for port if it is connected to a network device that also support the feature.

- The default wiring configuration of automatic MDIX detection is not appropriate for the NET MGMT port if it is connected to a network device that does not support the feature. You should disable automatic MDIX detection and set the wiring configuration manually with the POLARITY command.

After cabling the ports in the chassis, go to Chapter 7, “Powering On the Chassis” on page 127.

Chapter 7

Powering On the Chassis

This chapter describes how to power on the chassis and monitor the initialization process. The chapter contains the following sections:

- “Verifying the Installation” on page 128
- “Applying A/C Power to the AT-SBxPWRSYS1 Power Supplies” on page 129
- “Applying A/C Power to the AT-SBxPWRPOE1 Power Supplies” on page 132
- “Monitoring the Initialization Process” on page 135

Verifying the Installation

Please perform the following procedure before powering on the chassis:

1. Verify that the grounding lug on the back panel of the chassis is properly grounded. For instructions, refer to “Installing the Chassis Grounding Lug” on page 78.

2. Verify that all empty slots on the front panel of the chassis are covered with slot covers. If there are open slots, perform the procedure “Installing the Blank Slot Covers” on page 106.

3. Verify that dust plugs are installed in all empty SFP and SFP+ slots on the AT-SBx81GS24a and AT-SBx81XS6 Line Cards.

4. Verify that dust covers are installed on all SFP and SFP+ transceivers that do not have cables.

5. Verify that the chassis has at least one AT-SBx81CFC400 Controller Fabric Card in slot 5 or 6.

6. Verify that the chassis has at least one AT-SBxPWRSYS1 Power Supply in slot C or D.

7. If the chassis has AT-SBx81GP24 Line Cards, verify that the chassis has at least one AT-SBxPWRPOE1 Power Supply in slot A or B.

8. When you installed the AT-SBx81CFC400 Controller Fabric Card, did you remove the battery insulator, shown in Figure 56 on page 98? If not, remove the controller card from the chassis, remove the insulator from the battery, and reinstall the card.

You may now power on the chassis, as explained in “Applying A/C Power to the AT-SBxPWRSYS1 Power Supplies” on page 129.

Applying A/C Power to the AT-SBxPWRSYS1 Power Supplies

The procedure in this section explains how to power on the AT-SBxPWRSYS1 Power Supplies in slots C and D on the front panel. If you have not already installed the power supplies, refer to “Installing the AT-SBxPWRSYS1 System Power Supply” on page 83 for installation instructions.

Note
If the chassis has both AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies, you may power on the power supplies in any order. The power supplies may also be powered on simultaneously.

To power on the chassis, perform the following procedure:

1. Identify AC sockets C and D in the recessed panel on the back panel of the chassis, shown in Figure 80. These sockets are for the AT-SBxPWRSYS1 System Power Supplies in slots C and D on the front panel of the chassis.

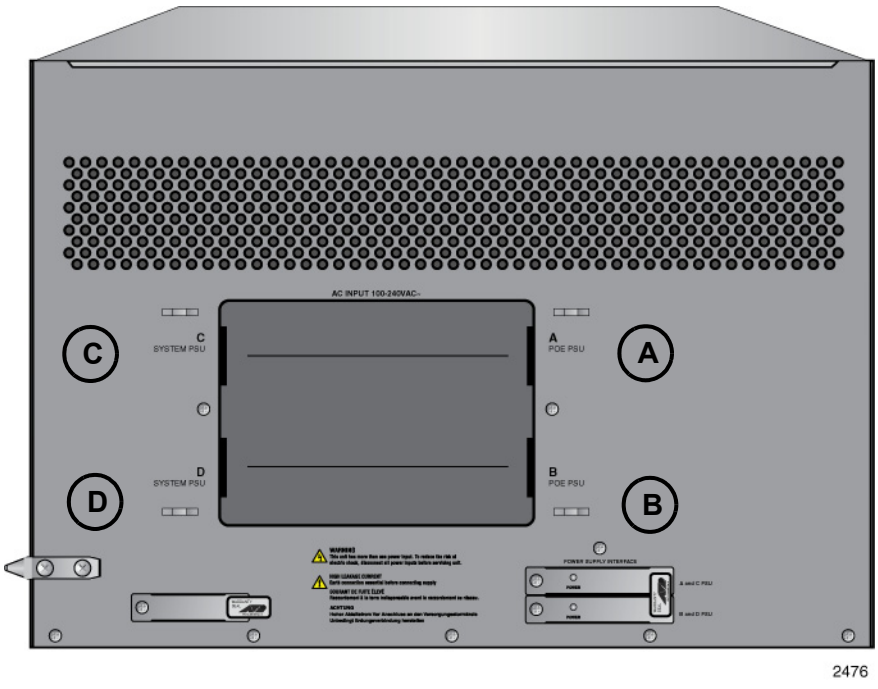


Figure 80. AC Sockets on the Rear Panel of the AT-SBx8112 Chassis

2. Plug the AC power cord that comes with the power supply into a plug whose corresponding slot on the front panel has a system power supply.

If there are two system power supplies, you may power on either supply first. The illustration in Figure 81 shows the connection of an AC power cord to connector D.

Figure 81. Connecting the AC Power Cord for the AT-SBxPWRSYS1 Power Supply

3. Use the twist tie included with the power supply to secure the cord to an anchor on the chassis to protect it from being accidentally pulled out, as shown in Figure 82 on page 131.

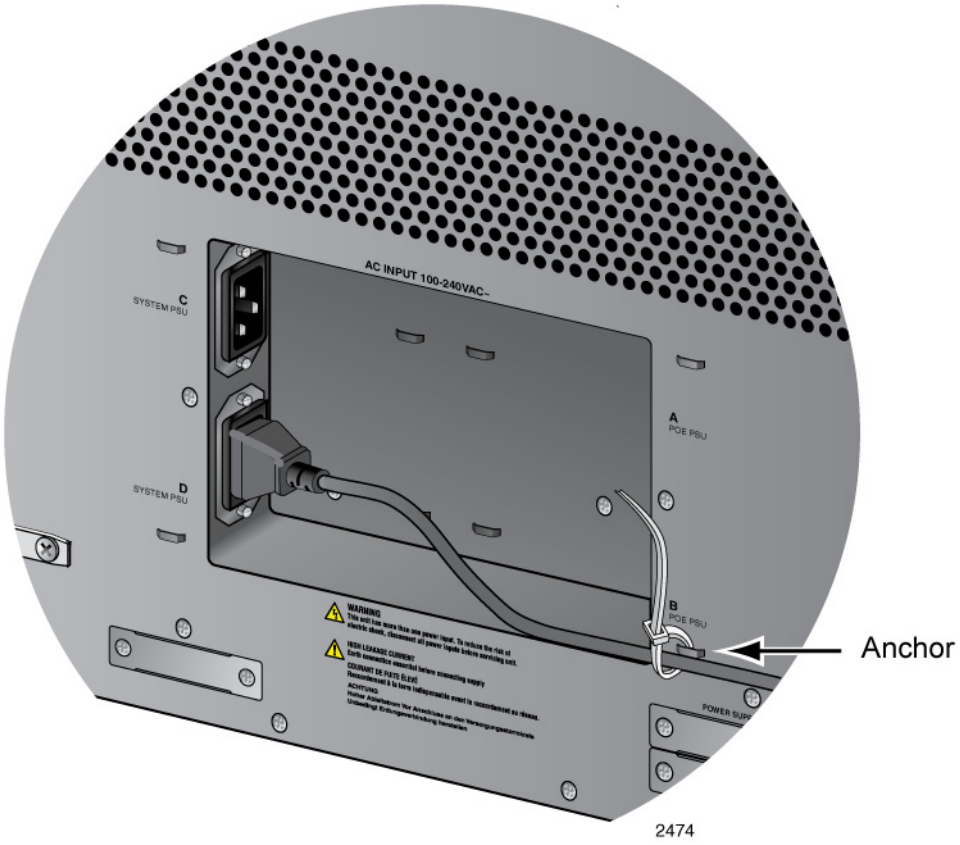


Figure 82. Securing the Power Cord for the AT-SBxPWRSYS1 Power Supply to an Anchor

4. Connect the power cord to an appropriate AC power source to power on the power supply.

5. If the chassis has two AT-SBxPWRSYS1 System Power Supplies, repeat steps 1 to 4 to power on the second power supply.

After powering on the AT-SBxPWRSYS1 System Power Supplies, do one of the follow:

- If the chassis has AT-SBxPWRPOE1 PoE Power Supplies, perform the procedure in “Applying A/C Power to the AT-SBxPWRPOE1 Power Supplies” on page 132.
- Otherwise, go to “Monitoring the Initialization Process” on page 135.

Applying A/C Power to the AT-SBxPWRPOE1 Power Supplies

If you have not already installed the AT-SBxPWRPOE1 Power Supplies, refer to “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 89 for installation instructions. To power on the power supplies, perform the following procedure:

1. Identify AC sockets A and B in the recessed panel on the back panel of the chassis, shown in Figure 80 on page 129. The sockets are for the AT-SBxPWRPOE1 Power Supplies in slots A and B on the front panel of the chassis.

2. Plug the AC power cord that comes with the power supply into one of the plugs, as shown in Figure 83.

   The plug should have a power supply in the corresponding slot in the front panel. If the chassis has two AT-SBxPWRPOE1 Power Supplies, you may power on either supply first.

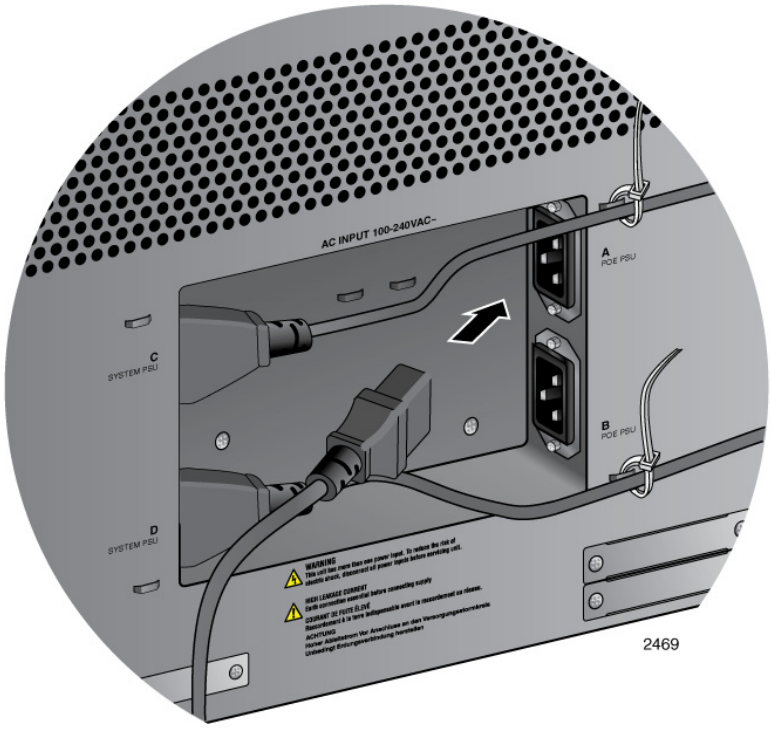


Figure 83. Connecting the AC Power Cord for the AT-SBxPWRPOE1 Power Supply

3. Use the twist tie that comes with the power supply to secure the cord to an anchor on the chassis, as shown in Figure 84.

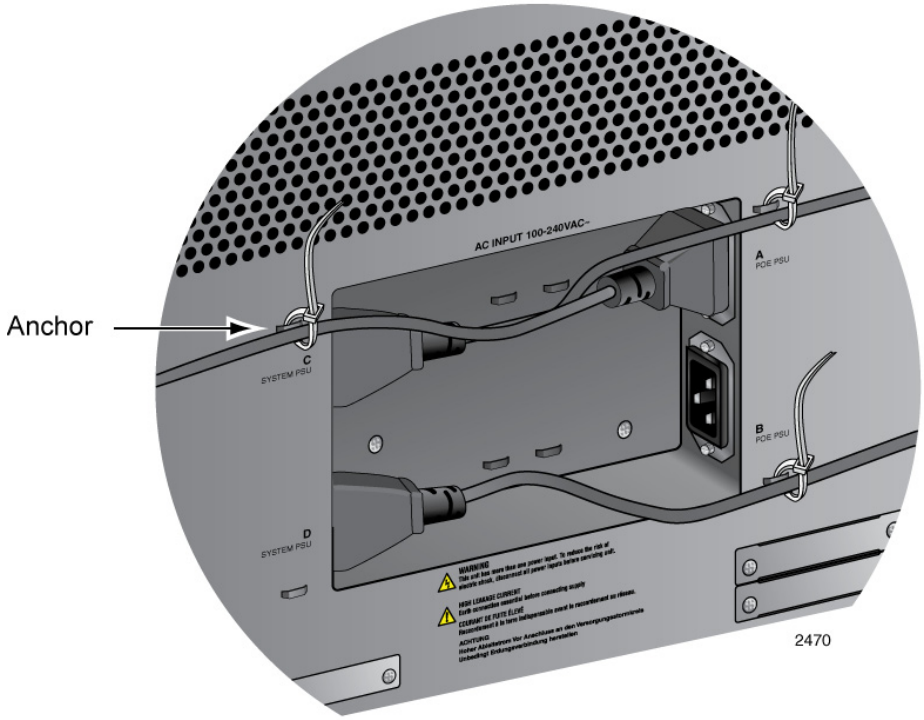
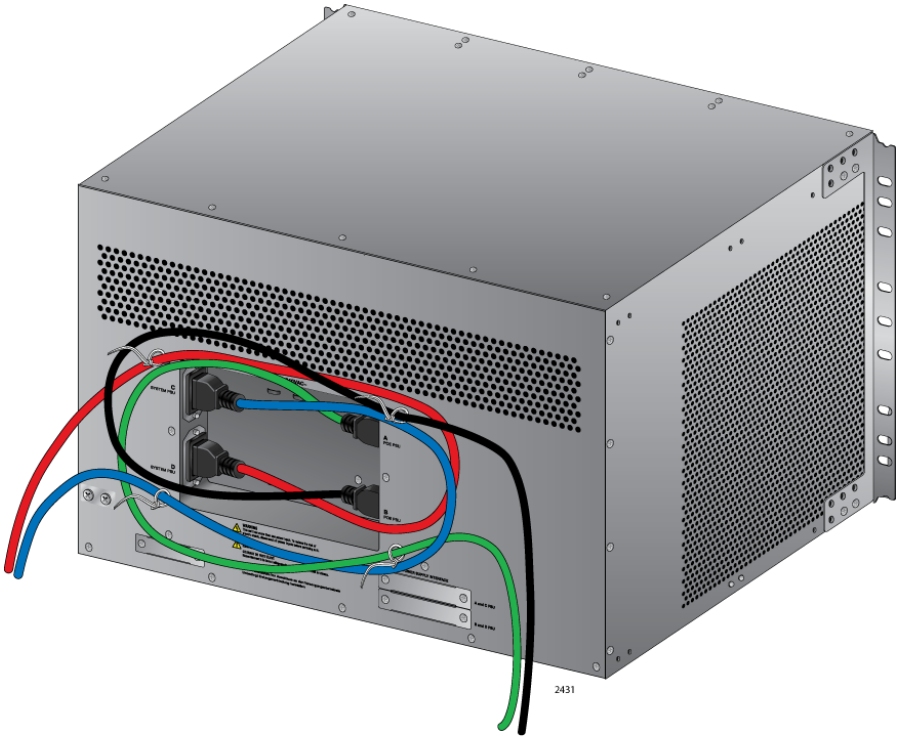


Figure 84. Securing the Power Cord for the AT-SBxPWRPOE1 Power Supply to an Anchor

4. Connect the power cord to an appropriate AC power source to power on the power supply.

5. If the chassis has two AT-SBxPWRPOE1 Power Supplies, repeat this procedure to power on the second power supply.

   Figure 85 on page 134 is an illustration of the power cords for a chassis with four power supplies.



A POE PSU power cord
B POE PSU power cord
C System PSU power cord
D System PSU power cord

NOTE: The power cords shown in this figure are in color for clarity only. All power cords are black.

Figure 85. Dress and Secure AC Power Cords

6. Go to “Monitoring the Initialization Process” on page 135.

Monitoring the Initialization Process

The line and controller cards perform an initialization process when you power or reset the chassis. The initialization process takes approximately two minutes to complete. The line cards do not begin to forward traffic from their ports until the process is finished.

The process has two phases. In the first phase, which takes approximately one minute, the controller card loads and initializes its management software and, if there are two controller cards in the chassis, set its active or standby state. In the second phase, the Ethernet line cards receive their management software from the active controller card, initialize the software, and configure their parameter settings according to the configurations provided by the active controller card. This phase also takes one minute, after which, the line cards begin to forward traffic.

You may monitor the initialization process by viewing either the LEDs on the cards or the messages on the Console port, as explained in the following sections

Using the LEDs to Monitor the Initialization Process

To monitor the first phase of the initialization process in which the controller card initializes its management software and establishes its active master or standby master state, examine the CFC LED in the System Status LEDs on the card. The LED flashes green while the card initializes its management software. When this phase is finished, the card changes the LED to solid green if it is the active master or solid amber if it is the standby master.

To monitor phase 2 in which the line cards initialize and configure their management software, watch the SBx Linecard Status LEDs. There are twelve LEDs (numbered 1 to 12), one for each slot. The LED for a slot flashes green while the corresponding line card initializes its management software and configures its settings in accordance with the settings from the active controller card. The LED changes to solid green when the line card completes the initialization process and begins forwarding traffic.

Using the Console Port to Monitor the Initialization Process

Another way to monitor the initialization process of the chassis is to connect a terminal or PC with a terminal emulator program to the Console port on the controller card and watch the status messages. If the chassis has two controller cards, you should use the Console port on the controller card in slot 5. (The settings for the terminal or terminal emulator program are found in “Using Local Management to Verify the Chassis” on page 142.) Figure 86 on page 136 and Figure 87 on page 137 illustrate the messages. The controller and line cards are fully initialized and forwarding network traffic when the Console port displays the “awplus login” prompt.

```
Verifying release... OK
Booting...
Starting base/first...                          [ OK ]
Mounting virtual filesystems...                 [ OK ]

        /\ \                  / /_____\
      /  \ \       __/ /| _____ |
    /     \ \     |__/ / |_____|
  /        \ \   / /     \ ____ /
 /_____/\____\ \/ /_____________/

Allied Telesis Inc.
AlliedWare Plus (TM) v5.4.2
Current release filename: SBx81CFC400-5.4.2.rel
Original release filename: SBx81CFC400-5.4.2.rel
Built: Tue Oct 11 16:36:59 NZDT 2011 by: maker@maker06-build
Mounting static filesystems...                  [ OK ]
Checking flash filesystem...                    [ OK ]
Mounting flash filesystem...                    [ OK ]
Checking for last gasp debug output...          [ OK ]
Checking NVS filesystem...                      [ OK ]
Mounting NVS filesystem...                      [ OK ]
Starting base/rename-eth...                     [ OK ]
Starting base/arm_sysctl...                     [ OK ]
Starting base/dbus...                           [ OK ]
Starting base/syslog...                         [ OK ]
Starting base/lif_ok...                         [ OK ]
.
.
.
Received event modules.done
Received event board.inserted
Received event hardware.done
Starting network/startup...                     [ OK ]
Starting network/stackd...                      [ OK ]
Starting network/election.timeout...            [ OK ]
Received event network.enabled

Initializing HA processes:

08:24:38 awplus-5 chassis[1492]: Card 6 (AT-SBx81CFC400) has joined chassis
08:24:40 awplus-5 chassis[1492]: Card 6 (AT-SBx81CFC400) has become the
Active C
08:24:40 awplus-5 chassis[1492]: Card 12 (AT-SBx81XZ4) has joined chassis
08:24:40 awplus-5 chassis[1492]: Card 10 (AT-SBx81GP24) has joined chassis
08:24:40 awplus-5 chassis[1492]: Card 2 (AT-SBx81GP24) has joined chassis
08:24:40 awplus-5 chassis[1492]: Card 4 (AT-SBx81GP24) has joined chassis
Received event vcs.elected-slave
08:24:44 awplus-5 chassis[1492]: Card has booted as one off boot, SW version
au.
```

Figure 86. Switch Initialization Messages

```
auth, bgpd, cntrd, epsr, exfx, hostd, hsl
imi, imiproxyd, irdpd, lacp, lldpd, loopprot, mstp
nsm, openhpid, ospf6d, ospfd, pdmd, pimd, ripd
ripngd, rmon, sflowd, vrrpd
.
.
.
Received event network.active

Loading configuration file from active CFC, please wait.
.

done!
Received event network.configured

awplus login:
```

Figure 87. Switch Initialization Messages (Continued)

Chapter 8

Verifying the Hardware Operations of the Chassis

This chapter describes how to verify the operations of the chassis. The chapter contains the following sections:

- “Using the LEDs to Verify the Chassis” on page 140
- “Using Local Management to Verify the Chassis” on page 142

Note
Allied Telesis recommends using both methods to confirm the operations of the chassis, controller cards, and line cards.

Using the LEDs to Verify the Chassis

After powering on the chassis for the first time and waiting a minimum of two minutes for the line and controller cards to complete the initialization process, check the operational status of the various hardware components by examining the LEDs, as explained in this procedure:

1. Check the LEDs on the AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies. The power supplies are operating properly when the AC and DC LEDs are solid green and Fault LEDs are off. If there is a problem with a power supply, refer to “AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies” on page 148 for troubleshooting suggestions.

2. Check the Power LED on the AT-SBxFAN12 module. The module is operating normally when the LED is solid green. If the LED is off, the fan module has a problem or failed. Power off the chassis and contact your Allied Telesis representative for assistance. Do not operate the chassis without a fully operational fan unit.

3. If the chassis has one controller card, check the CFC LED on the card. It should be solid green. If the LED is flashing green, the card is still initializing its management software. Wait another minute and check the LED again. If the LED is still flashing green, the card may have encountered a problem that prevents it from completing the initialization process. Power off the chassis and replace the controller card.

   Note
   If all the LEDs on the controller card are off, they may have been turned off. Try pressing the eco-friendly button on the card to turn them on.

4. If the chassis has two controller cards, check the CFC LEDs on both cards. The cards are operating correctly when the LEDs are solid green on one card and solid amber on the other. If both LEDs are flashing green, the controller cards are still completing the initialization process. If the LEDs do not change to solid green and amber after another minute, the cards may have encountered a problem that prevents them from completing the initialization process. Power off the chassis and replace the cards.

5. To check the status of the Ethernet line cards, inspect the SBx Linecard Status LEDs on the controller card. (If the chassis has two controller cards, you may use the LEDs on either card.) A line card is operating normally when it corresponding LED is solid green. The LED flashes green as the card initializes its management software. If an

LED is flashing green after two minutes, the corresponding line card may have a problem and cannot complete the initialization process. For example, the line card in slot 8 of the chassis is operating normally when the SBx Linecard Status, number 8 LED is solid green. For troubleshooting suggestions, refer to “Ethernet Line Cards” on page 149.

6. To check the status of the links of the individual ports on the line cards, inspect the L/A LEDs on the cards. The LEDs should be solid or flashing green on ports that are connected to active network devices. If there is a problem with a link, refer to “Twisted Pair Ports” on page 151 and “Fiber Optic Transceivers” on page 155 for troubleshooting suggestions.

7. To check the status of PoE on the ports of the AT-SBx81GP24 Line Card, use the PoE LEDs, shown in Figure 16 on page 36. The LEDs are solid green when ports are delivering power to powered devices on your network. If there is a problem, refer to “Power Over Ethernet” on page 153 for troubleshooting suggestions.

Using Local Management to Verify the Chassis

This section explains how use the commands in the management software on the controller card to confirm the operations of the chassis. The section has the following procedure:

- ❒ “Starting a Local Management Session” on page 142
- ❒ “Entering the Management Software Commands” on page 143

The initial management session of the switch must be a local management session. For instructions on how to configure the chassis for remote management with a Telnet or Secure Shell client, refer to the *Software Reference for SwitchBlade x8100 Series Switches*.

Starting a Local Management Session

To start a local management session, perform the following procedure:

1. Connect the RJ-45 end of the management card included with the AT-SBx81CFC400 Controller Fabric Card to the Console RS-232 port on the front panel of the AT-SBx81CFC400 Control Card, as shown in Figure 88. If the chassis has two controller cards, you must connect the cable to the Console RS-232 port on the active master card. To determine which card is the active master controller card, examine the CFC LEDs. The LEDs are green on the active master controller card and amber on the standby master controller card.

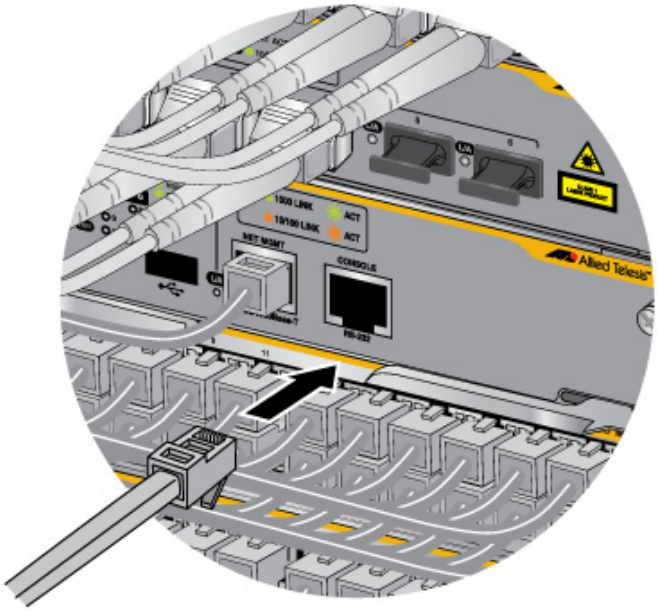


Figure 88. Connecting the Management Cable to the Console RS-232 Port

2. Connect the other end of the cable to an RS-232 port on a terminal or personal computer with a terminal emulation program.
3. Configure the VT-100 terminal or terminal emulation program as follows:
   - ❒ Baud rate: 115,200 bps
   - ❒ Data bits: 8
   - ❒ Parity: None
   - ❒ Stop bits: 1
   - ❒ Flow controller: None

   Note
   The port settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulator program.

4. Press Enter. You are prompted for a user name and password.
5. Enter the default user name and password. They are “manager” and “friend” (without the quotes), respectively

   Note
   User names and passwords are case sensitive.

   The local management session starts and the command line interface (CLI) prompt is displayed.

Entering the Management Software Commands

To confirm the operations of the chassis with the commands in the management software, perform the following procedure:

1. Enter the SHOW VERSION command in the User Exec or Privileged Exec mode to display the software version number of the management software on the controller card, as shown in Figure 89 on page 144.

```
swplus# show version

AlliedWare Plus (TM) 5.4.2

Build name : SBx81CFC400-5.4.2.rel
Build date : Wed Dec 2 12:13:19 NZDR 2011
Build type : RELEASE
    NEW-SNMP SNMP agent software
    (c) 1996, 1998-2000 The Regents of the University of California.
         All rights reserved;
.
.
.
```

Software Version Number

Figure 89. SHOW VERSION Command

2. Compare the version number displayed by the SHOW VERSION command with the information in Table 17 on page 55 to confirm that the management software on the controller card supports all the hardware components in the chassis. If necessary, update the management software on the controller card.

3. To display the status of the power supplies, fan module, and AT-SBx81CFC400 Control Cards, use the SHOW SYSTEM ENVIRONMENT command in the User Exec or Privileged Exec mode. The Status column in the display provides the states of the modules. Components are operating normally when they have an “Ok” status.

4. To display the status of the line cards, use the SHOW CARD command in the Privileged Exec mode A line card has a state of “Online” when it is operating normally. An example of the status information is shown in Figure 90.

```
awplus# show card

Slot    Card Type          State
-------------------------------------------------
1       AT-SBx81GP24       Online
2       AT-SBx81XS6        Online
3       AT-SBx81GP24       Online
4       AT-SBx81GS24a      Online
5       AT-SBx81CFC400     Online (Active)
6       AT-SBx81CFC400     Online (Standby)
7       AT-SBx81GP24       Online
8       AT-SBx81GS24a      Online
9       AT-SBx81GP24       Online
10      AT-SBx81XS6        Online
11      AT-SBx81GP24       Online
12      AT-SBx81GS24a      Online
```

Figure 90. SHOW CARD Command

5. To display the states of the individual ports on the Ethernet line cards, use the SHOW INTERFACE STATUS command in the Privileged Exec mode.

6. To check the status of PoE on the ports of the AT-SBx81GP24 Line Card, use the SHOW POWER-INLINE or SHOW POWER-INLINE INTERFACE command in the User Exec or Privileged Exec mode.

   For information about the command line interface, refer to the *Software Reference for SwitchBlade x8100 Series Switches* on the Allied Telesis web site.

Chapter 9
Troubleshooting

This chapter contains information on how to troubleshoot the SwitchBlade x8112 product.

> **Note**
> If you are unable to resolve a hardware problem with the instructions in this chapter, contact Allied Telesis Technical Support for further assistance. Refer to “Contacting Allied Telesis” on page 15 for contact information.

The following troubleshooting information is available:

- “AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies” on page 148
- “Ethernet Line Cards” on page 149
- “Twisted Pair Ports” on page 151
- “Power Over Ethernet” on page 153
- “Fiber Optic Transceivers” on page 155
- “AT-SBx81CFC400 Controller Fabric Card” on page 156
- “AT-SBxFAN12 Fan Module” on page 157
- “Local (Out-of-Band) Management Session” on page 158
- “Power Supply Interfaces (Opto-couplers)” on page 159

AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies

A power supply is operating normally when its AC and DC LEDs are solid green and the Fault LED is off. Possible fault conditions and their solutions are described here:

Fault Condition 1: If the AC LED is off, the power supply is not receiving power, has overheated and been disabled, or has failed and needs to be replaced. Try the following:

- Verify that there is a power cord connected to the power supply's connector on the back panel of the chassis. For example, if a power supply in slot C does not have power, check for a power cord on connector C on the back panel.
- Verify that the power cord is securely connected to the chassis and the AC power source.
- Verify that the AC power has power by connecting another device to it.
- Verify that the power from the AC power source is within the required levels for your region.
- If the chassis is still operating, use the SHOW PSU or SHOW PSU ALL command from a local or remote management session to determine if the power supply has overheated and shutdown.

Fault Condition 2: If the AC LED is solid green and the DC LED is off, the power unit is generating insufficient DC power. Replace the power supply.

Fault Condition 3: If the Fault LED is solid amber, try the solutions in Fault Condition 1. If they do not resolve the problem, replace the power supply.

Note
The power supplies are hot swappable in a redundant configuration. This allows the AT-SBx8112 Chassis to continue operating while you exchange power supplies.

Fault Condition 4: If the LEDs on the power supply indicate normal operations but the PSU LED on the active master controller card is showing a fault condition, the problem may be with one of the two power supply interfaces (opto-couplers) on the rear panel of the chassis. For troubleshooting suggestions, refer to "Power Supply Interfaces (Opto-couplers)" on page 159.

Caution
The power supply interfaces are *not* hot swappable and should only be serviced by an authorized service technician.

Ethernet Line Cards

A quick and easy way to check the overall heath of the Ethernet line cards in the chassis is with the SBx STATUS LEDs on the controller card. (If the chassis has two controller cards, you may use the LEDs on either card.) There are twelve LEDs, one for each slot. The LEDs are numbered 1 to 12, just like the slots. The cards in the slots are operating normally when the LEDs are green. The Ethernet line card in slot 8 of the chassis, for example, is operating normally when the SBx STATUS LED 8 on the controller card is solid green.

If you suspect a problem with an Ethernet line card or controller card, try the following:

- If all the L/A LEDs on the card are off, try pressing the eco-friendly button on the active master controller card to verify that the LEDs on the line cards are on.
- Check the card's status LED in the SBx STATUS LEDs on the controller card. If the LED is flashing amber, the card is initializing its management software. Wait one to two minutes for the card to complete the process. If the LED does not change to green, try installing the line card in a different slot. If the problem remains, the card cannot complete the initialization process. Try installing the card in another chassis with a different controller card.
- If the card's status LED in the SBx STATUS LEDs on the controller card is solid amber, the card might not be able to boot up because the controller card does not have its load file and needs to be updated.

Here are some other steps to try:

- Check that the card is completely installed in the slot and that the front plate is flush with the front of the chassis.
- Try resetting the card with the REBOOT CARD command. The example of the command restarts the card in slot 2:

```
awplus# reboot card 2

Reboot card 2 system? (y/n)? y

awplus#
```

- Try installing the card in a different slot. If it works in the new slot, the problem is with the previous slot.
- Try installing the card in a different chassis. If it works in the new chassis, the problem is with the previous chassis. If the problem persists, the problem is with the card.

- You can obtain card status information with the SwitchBlade x8112 Management Software and the SHOW CARD command, as follows:

```
awplus# show card
```

Twisted Pair Ports

The ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards have L/A LEDs that are solid or flashing green when the ports are operating at 1000 Mbps, and solid or flashing amber at 10 or 100 Mbps. If a port is cabled to a network device but the L/A LED is off, try the following:

- If all the L/A LEDs on the cards are off, try pressing the eco-friendly button on the active master controller card to verify that the LEDs on the line cards are on.
- Verify that the end node connected to the port is powered on and operating properly.
- Check that the twisted pair cable is securely connected to the ports on the line card and the end node.
- Make sure that the twisted pair cable does not exceed 100 m (328 ft).
- Refer to Table 1 on page 30 and Table 2 on page 30 to verify the appropriate categories of twisted-pair cables for the AT-SBx81GT24 and AT-SBx81GP24 Line Cards, respectively.
- Verify that the twisted-pair cable is not faulty by replacing it with a known good cable.
- Make sure that the operating parameters of the port on the line card and the parameters of the end node are compatible.

If the L/A LED for a port is green, signalling a link to the network device, but link performance is poor or intermittent, the problem may be from a bad cable. Try replacing the cable, as explained in “Cabling Guidelines for the Twisted Pair Ports on the AT-SBx81GP24 and AT-SBx81GT24 Line Cards” on page 110.

Another source of poor or intermittent performance on a link can be a speed, duplex mode, or wiring configuration mismatch between a port and network device. Here are some items to consider when resolving this type of problem:

- The default speed setting for the ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Aut-Negotiation.
- The default speed setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have fixed speeds or 10 or 100 Mbps. For those switch ports, you should disable Auto-Negotiation and set the port’s speed manually to match the speeds of the network devices.
- The ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.

- The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.
- The default duplex mode setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have a fixed duplex mode. Disable Auto-Negotiation on those ports and set the duplex modes manually to avoid the possibility of duplex mode mismatches. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation, which can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

The MDI/MDIX wiring configurations of the ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards are set automatically with automatic MDIX detection when the ports are operating at 10 or 100 Mbps. (Automatic MDIX detection does not apply to the ports when they are operating at 1000 Mbps.) You may not disable this feature on the ports. For automatic MDIX detection to work successfully, the network device connected to a port must also support the feature. If it does not, a port defaults to MDIX. This may require the use of a crossover cable. Here are the guidelines to choosing straight-through or crossover cables for the ports:

- You may use straight-through cables on ports that are connected to network devices that operate at 1000 Mbps.
- You may use straight-through or crossover cables on ports that are connected to network devices that support automatic MDIX detection and that operate at 10 or 100 Mbps.
- You *must* use straight-through cables on ports that are connected to network devices that have a fixed wiring configuration of MDI and that operate at 10 or 100 Mbps.
- You *must* use crossover cables on ports that are connected to network devices that have a fixed wiring configuration of MDIX and that operate at 10 or 100 Mbps.

Power Over Ethernet

This section applies only to the AT-SBx81GP24 Line Card. Each port has two LEDs. The left LED provides port link and activity status and the right LED provides PoE status information. The PoE LED is solid green when a port is delivering power to a powered device (PD). The PoE LED of a port that is not delivering power will be flashing amber, steady amber, or off. If a powered device is not receiving power from a port on the line card, try the following:

- If all the L/A LEDs on the line cards in the chassis are off, try pressing the eco-friendly button on the active master controller card to turn on the LEDs.
- Check to be sure that the chassis has at least one AT-SBxPWRPOE1 Power Supply and that the unit is operating properly. The AC and DC LEDs should be solid green and the Fault LED should be off. For troubleshooting suggestions, refer to “AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies” on page 148.
- Review the PD’s documentation to confirm that it supports Mode A of the IEEE 802.3at standard. Mode A is one of two modes that define the connector pins that deliver the power from the port on the line card to the PD. In Mode A, the power is carried on pins 1, 2, 3, and 6 on the RJ-45 port, the same pins that carry the network traffic. The second mode, Mode B, defines pins 4, 5, 7, and 8 as the power carriers. The AT-SBx81GP24 Line Card does not support Mode B. Most powered devices are designed to accept power by either mode, but some legacy devices may only support one mode. This can be verified by reviewing the device’s documentation or data sheet. Legacy devices that only support Mode B will not work with this line card.
- Review the device’s documentation or data sheet to confirm that its power requirements do not exceed 30 W.
- Verify that you are using the appropriate category of twisted-pair cable by referring to Table 2 on page 30.
- Try replacing the twisted-pair cable, as explained in “Cabling Guidelines for the Twisted Pair Ports on the AT-SBx81GP24 and AT-SBx81GT24 Line Cards” on page 110.
- Use the SHOW POWER-INLINE command in the management software to determine whether PoE is enabled on the port. The default setting for PoE is enabled.
- Use the SHOW POWER-INLINE command to determine whether the PoE power setting for the port has been reduced from the default setting of 30 W, to a value below the power requirements of the device.

- Use the SHOW POE CARD command to determine whether the switch has reach its maximum power budget.
- Try connecting the PD to a port on a different AT-SBx81GP24 Line Card.

Fiber Optic Transceivers

The L/A LEDs on the AT-SBx81GS24a and AT-SBx81XS6 Line Cards are solid or flashing green when ports on fiber optic transceivers have links to end nodes. If a transceiver is cabled to an end node but the L/A LED is off, try the following:

- If all of the L/A LEDs on the line cards in the chassis are off, try pressing the eco-friendly button on the active master controller card to turn on the LEDs.
- Check that the fiber optic transceiver is firmly inserted into the slot on the line card.
- Check that both ends of the fiber optic cable are securely connected to the ports on the transceiver and end node.
- Verify that the end node is powered on and operating properly.
- Review the operating specifications of the fiber optic transceiver and end node to verify that the devices have the same speed and duplex mode.
- Check that the operating specifications, including wavelength and maximum operating distance, of the transceiver are compatible with the fiber optic port on the end node.
- Make sure that you are using the appropriate type of fiber optic cable and that the cable length does not exceed the allowed maximum distance. The cable specifications for the transceivers are provided in the installation instructions that ship with the modules.
- Use a fiber optic tester to test the whether the optical signal is too weak (i.e., sensitivity) or too strong (i.e., maximum input power). The operating specifications of the fiber optic transceivers are shipped with the units.
- Try replacing the fiber optic cable.
- Check the two strands of the fiber optic cable to be sure that the receive fiber connector is connected to the transmit connector on the remote end node, and that the transmit fiber connector is connected to the receive connector on the end node.

AT-SBx81CFC400 Controller Fabric Card

The consequences of a controller card failure on the operations of the Ethernet line cards depends on the number of controller cards in the chassis. If the chassis has one controller card and the card fails, all network operations stop. The Ethernet line cards stop forwarding all network traffic until the controller card is replaced.

If the chassis has two controller cards and one fails, the Ethernet line cards continue to forward traffic, but the traffic bandwidth across the backplane is reduced from 800 to 400 Gbps, which, depending on the number of Ethernet line cards present and the amount of traffic traversing the backplane, may result in slower network operations.

If the chassis has one controller card, examine the M/S LED on the card. The LED should be solid green. If the LED is flashing amber, the card is initializing its management software. Wait one or two minutes for the card to complete the process and check the LED again. If it has not changed to solid green, the card cannot complete the initialization process. Try moving the controller card to the other controller card slot, slot 5 or 6, to see if it works in a different slot. You might also try connecting a terminal or PC with a terminal emulator program to the Console RS232 port to watch for any error messages.

If the chassis has two controller cards, check the M/S LEDs on both cards. The LEDs should be solid green on one card and solid or flashing amber on the other card. If the LEDs are both flashing amber, they are initializing their management software. Wait one or two minutes for the cards to complete the process and check the LEDs again. If both LEDs are still flashing amber, the cards cannot complete the initialization process. Try replacing the cards.

The controller card has an onboard battery to maintain the date and time when the chassis is powered off or reset. If you manually set the date and time but the card loses the information after you power off or reset the unit, you may have forgotten to remove the battery insulator when you installed the card in the chassis. The insulator is shown in Figure 56 on page 98. The only way to remedy the problem is to remove the controller card from the chassis and remove the battery insulator. If the chassis has only one controller card, removing the card causes the Ethernet line cards to stop forwarding traffic.

AT-SBxFAN12 Fan Module

The AT-SBxFAN12 Fan Module is operating correctly when the POWER LED on the module is solid green. If the LED on the fan module is off, check the FAN LED in the SYS STATUS section on the active master controller card. The LED should be green. If the FAN LED is off or flashing amber, one or more fans in the module are no longer operating properly. You may also view the status of the unit with the SHOW FANMODULE command in the management software.

You may notice changes in the fan speeds. This is normal. The active master controller card automatically adjusts the fan speeds according to the internal temperature of the chassis.

Note
The AT-SBxFAN12 Fan Module is hot swappable. You do not have to power off the AT-SBx8112 Chassis to replace the module.

Local (Out-of-Band) Management Session

If you are unable to establish a local (out-of-band) management session with the switch through the Console RS-232 port on the active master controller card, do the following:

- ❒ Check to be sure that the RJ-45 serial management cable is securely connected to the Console RS-232 port on the active master controller card and the RS-232 port on the terminal or personal computer.
- ❒ If the chassis has two controller cards, verify that the management cable is connected to the console port on the active master controller card by examining the M/S LEDs on the cards. The LEDs are solid green on the active master controller card and solid or flashing amber on the standby master controller card.
- ❒ Check to be sure that the operating parameters on the terminal or the terminal emulation program, if you are using a personal computer, have been set correctly. The default settings for the RJ-45 serial terminal port are located in “Using Local Management to Verify the Chassis” on page 142.
- ❒ Check to be sure that the terminal emulator application is compatible with a VT-100 terminal.

Power Supply Interfaces (Opto-couplers)

The two power supply interfaces in the lower right corner of the rear panel are used by the active master controller card to obtain status information from the power supplies. The interfaces are shown in Figure 23 on page 54.

Each power supply interface supports two power units. The top interface supports the power supplies in slots A and C. The bottom interface supports the supplies in slots B and D.

An interface is operating normally when its Power LED is solid green. The LED of an interface is off if the two corresponding power supply slots are empty or the power supplies are not powered on. For example, the LED for the bottom interface will be off if power supply slots B and D are empty or the power supplies are off.

The network operations of the chassis are not affected If one or both of the interfaces fail. However. the active master controller card changes the PSU LED to flashing amber to signal that it cannot communicate with the power supplies.

Note
The power supply interfaces are *not* hot swappable and can only be serviced by an authorized service technician.

If the Power LED on a power supply interface is off, do the following:

1. Check that there are power supplies in the corresponding slots in the front panel and that the power supplies are powered on. (The Power LED on an interface is off when the slots are empty or the power supplies are not powered on.)

2. Inspect the LEDs on the power supplies to check for a fault condition, If there is a fault condition, go to “AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies” on page 148 for troubleshooting suggestions. If the LEDs indicate the power supplies are operating normally, go to step 3.

3. Check the PSU LED on the active master controller card. If the LED is solid green, the power supplies and interfaces are operating normally. No corrective steps are required. If the PSU LED is solid amber but the LEDs on the power supplies indicate normal operations, there may be a problem with a power supply interface. Contact your Allied Telesis sales representative for assistance.

Appendix A

Technical Specifications

Physical Specifications

Dimensions (W x D x H)

Table 19. Product Dimensions

AT-SBx8112 Chassis	48.03 cm x 38.79 cm x 31.01 cm 18.91 in x 15.27 in x 12.21 in)
AT-SBxPWRSYS1 System Power Supply	10.16 cm x 32.21 cm x 4.34 cm (4.00 in x 12.68 in x 1.71 in)
AT-SBxPWRPOE1 PoE Power Supply	10.16 cm x 32.21 cm x 4.34 cm (4.00 in x 12.68 in x 1.71 in)
AT-SBxFAN12 Tray Module	2.74 cm x 33.35 cm x 26.04 cm (1.08 in x 13.13 in x 10.25 in)
All Cards AT-SBx81GT24 Line Card AT-SBx81GP24 PoE Line Card AT-SBx81GS24a SFP Line Card AT-SBx81XS6 SFP+ Line Card AT-SBx81CFC400 Controller Fabric Card	20.67 x 31.32 cm x 40.64 cm (8.14 in x 12.33 in x 1.6 in)

Weight (Kilograms)

Table 20. Product Weights

AT-SBx8112 Chassis	17.77 kg (39.10 lb) with 3 PSU and 10 Line Card blank panels
AT-SBx81GT24 Line Card	0.93 kg (2.05 lb)
AT-SBx81GP24 PoE Line Card	1.06 kg (2.34 lb)
AT-SBx81GS24a SFP Line Card	1.06 kg (2.34 lb)
AT-SBx81XS6 SFP+ Line Card	1.06 kg (2.34 lb)
AT-SBx81CFC400 Controller Fabric Card	1.09 kg (2.40 lb)

Table 20. Product Weights (Continued)

AT-SBxPWRSYS1 System Power Supply	2.75 kg (6.05 lb) with power cord
AT-SBxPWRPOE1 PoE Power Supply	2.73 kg (6.00 lb) with power cord
AT-SBxFAN12 Tray Module	1.82 kg (4.00 lb)

Environmental Specifications

Table 21. Environmental Specifications

Operating Temperature	-0° C to 40° C (32° F to 104° F)
Storage Temperature	-25° C to 70° C (-13° F to 158° F)
Operating Humidity	5% to 90% non-condensing
Storage Humidity	5% to 95% non-condensing
Operating Altitude Range	Up to 3,000 m (9,843 ft)
Acoustic Noise	75.7 dBm

Note
The acoustic noise was measured at 40° C with the following products installed:

Table 22. Acoustic Noise Test Components

Product	Quantity
AT-SBx8112 Chassis	1
AT-SBx81CFC400 Controller Fabric Card	2
AT-SBx81GP24 PoE Line Card	5
AT-SBx81XS6 SFP+ Line Card	5
AT-SBxPWRSYS1 System Power Supply	2
AT-SBxPWRPOE1 PoE Power Supply	2
AT-SBxFAN12 Tray Module	1

Power Specifications

AC Voltage, Frequency Requirements (Volts, Hertz)

Table 23. AC Voltage and Frequency Requirements

AT-SBxPWRSYS1 Power Supply	100 - 240 VAC, 50/60 Hz
AT-SBxPWRPOE1 Power Supply	100 - 240 VAC, 50/60 Hz

AC Input Current (Amps)

Table 24. AC Input Current

AT-SBxPWRSYS1 Power Supply	16 A Maximum
AT-SBxPWRPOE1 Power Supply	16 A Maximum

Typical power savings in eco-friendly mode (Watts)

Table 25. Typical Power Savings in eco-friendly Mode

AT-SBx81GT24	0.12 W
AT-SBx81GP24	0.24 W
AT-SBx81GS24a	0.20 W
AT-SBx81XS6	0.10 W
AT-SBx81CFC400	0.12 W

Maximum power consumption (Watts)

Table 26. Maximum Power Consumption

AT-SBx81GT24	34.4 W
AT-SBx81GP24	34.4 W
AT-SBx81GS24a	56.3 W
AT-SBx81XS6	54.8 W
AT-SBx81CFC400	48.3 W

Maximum power supply efficiency (based on 100V input voltage)

Table 27. Maximum Power Efficiency

12V PSU	78.4% (100% load) 81.8% (50% load)
56V PSU	81.3% (100% load) 83.6% (50% load)

Heat dissipation (British Thermal Units/hour)

Table 28. Heat Dissipation

AT-SBx81GT24	117.44 BTU/hr
AT-SBx81GP24	117.44 BTU/hr
AT-SBx81GS24a	192.21 BTU/hr
AT-SBx81XS6	187.02 BTU/hr
AT-SBx81CFC400	164.91 BTU/hr

Available Power over Ethernet (Watts/port):

Table 29. Available Power Over Ethernet with One PoE Power Supply

One PoE Power Supply Installed	1200 W @ 56 VDC
IEEE 802.3at Class 4 (30 W /port)	40 ports Maximum
IEEE 802.3af Class 3 (15.4 W /port)	77 ports Maximum
IEEE 802.3af Class 2 (7.3 W /port)	171 ports Maximum
IEEE 802.3af Class 1 (4.0 W /port)	240 ports Maximum

Table 30. Available Power Over Ethernet with Two PoE Power Supplies

Two PoE Power Supply Installed	2400 W @ 56 VDC
IEEE 802.3at Class 4 (30 W /port)	80 ports Maximum
IEEE 802.3af Class 3 (15.4 W /port)	155 ports Maximum
IEEE 802.3af Class 2 (7.3 W /port)	240 ports Maximum
IEEE 802.3af Class 1 (4.0 W /port)	240 ports Maximum

PoE Mode

Table 31. PoE Mode

IEEE 802.3af / IEEE 802.3at:	Alternative Mode A

Safety and Electromagnetic Emissions Certifications

Safety and Electromagnetic Emissions:

Table 32. Safety and Electromagnetic Emissions

EMI/RFI	FCC Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, CISPR Class A, VCCI Class A, AS/NZS Class A
Immunity	EN55024
Electrical Safety	N60950-1 (TUV), UL60950-1 ($_{c}$UL$_{us}$), EN60825
Safety Agency Approvals	$_{c}$UL$_{us}$, TUV, C-TICK, CE

Quality and Reliability - MTBF @ 30^{o}C:

Table 33. Quality and Reliability

AT-SBx8112 Chassis	260,000 Hours
AT-SBx81GT24 Line Card	340,000 Hours
AT-SBx81GP24 PoE Line Card	300,000 Hours
AT-SBx81GS24a SFP Line Card	330,000 Hours
AT-SBx81XS6 SFP+ Line Card	390,000 Hours
AT-SBx81CFC400 Controller Fabric Card	310,000 Hours
AT-SBxPWRSYS1 Power Supply	460,000 Hours
AT-SBxPWRPOE1 Power Supply	460,000 Hours
AT-SBxFAN12 Tray Module	460,000 Hours

Connectors and Port Pinouts

This section lists the connectors and connector pinouts for the AT-SBx81GT24 and AT-SBx81GP24 Line Cards.

Figure 91 illustrates the pin layout for an RJ-45 connector and port.

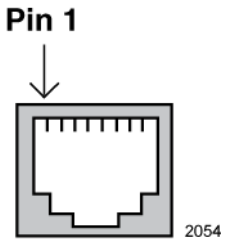


Figure 91. Pin Numbering for the RJ-45 Connectors (Front View)

Table 34 lists the RJ-45 pin signals when a twisted-pair port is operating in the MDI configuration.

Table 34. MDI Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 35 lists the RJ-45 port pin signals when a twisted-pair port is operating in the MDI-X configuration.

Table 35. MDI-X Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	RX+
2	RX-
3	TX+
6	TX-

Table 36 lists the RJ-45 connector pins and their signals when a 10/100/1000Base-T port is operating at 1000 Mbps.

Table 36. RJ-45 1000Base-T Connector Pinouts

Pin	Pair	Signal
1	1	TX and RX+
2	1	TX and RX-
3	2	TX and RX+
4	3	TX and RX+
5	3	TX and RX-
6	2	TX and RX-
7	4	TX and RX+
8	4	TX and RX-